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# PAPER TRADE JOURNAL

JANUARY 3, 1946


## THE CHEMIPULPER

***For Continuous Production of Semi-Chemical Pulps***

***B-K Reaction Chamber***

Patented and Patents Pending

**The CHEMIPULPER produces fibres for the manufacture of: (1) insulating (soft) board, hard board; (2) roofing and flooring felts: (3) special fibres for industrial uses such as bulk insulation, plastics, etc., and (4) semi-chemical pulps for the manufacture of paper and paper board.**

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**The Reaction Chamber is made in units and the number of these can be varied according to the degree of treatment required.**

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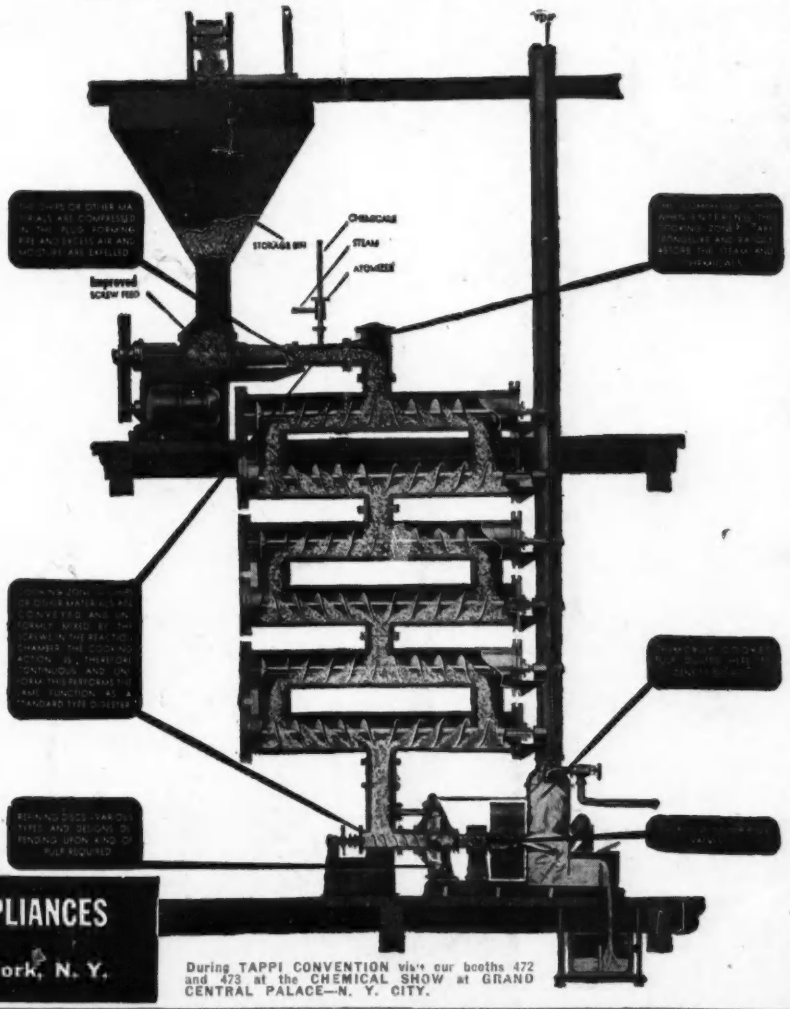


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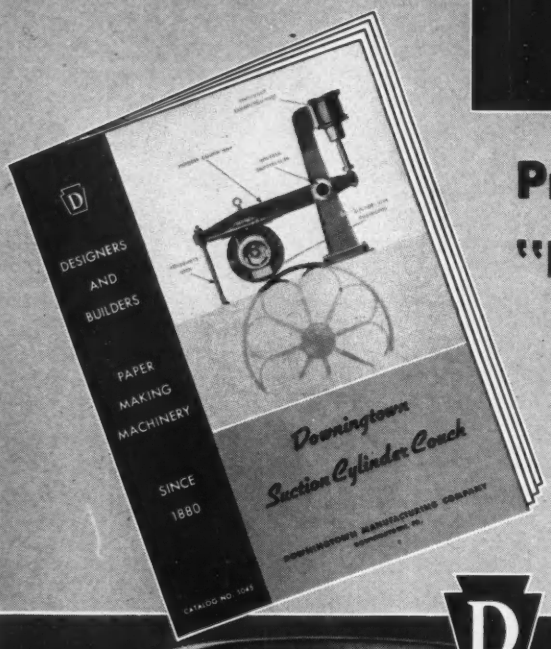


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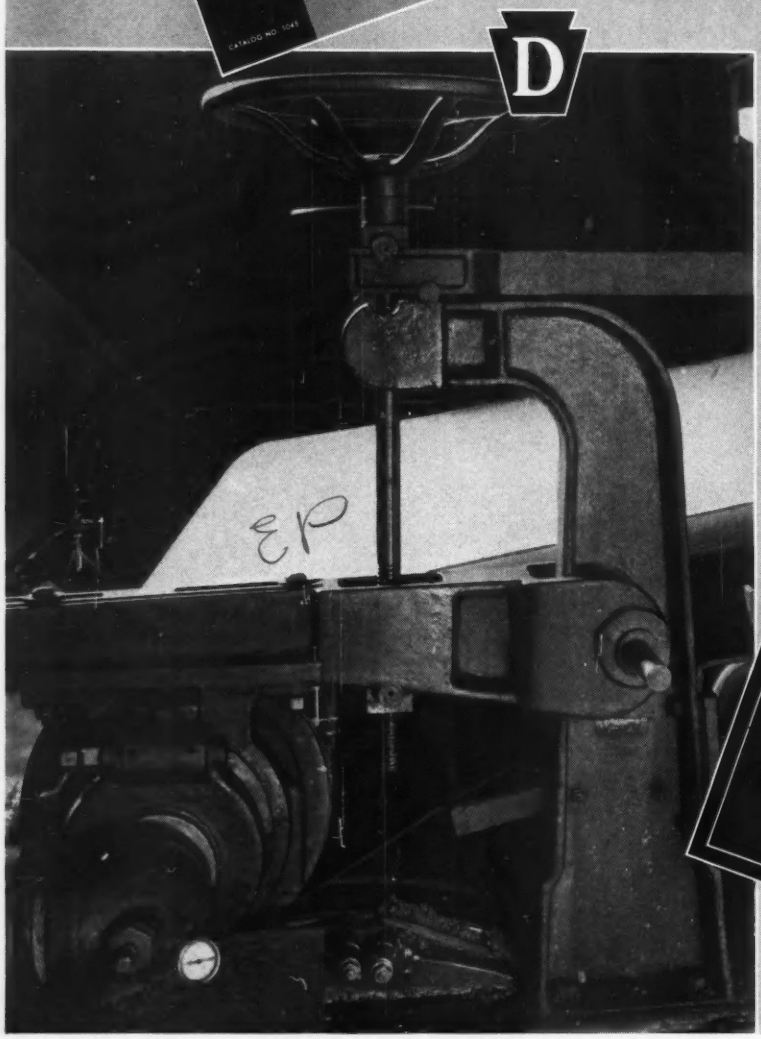

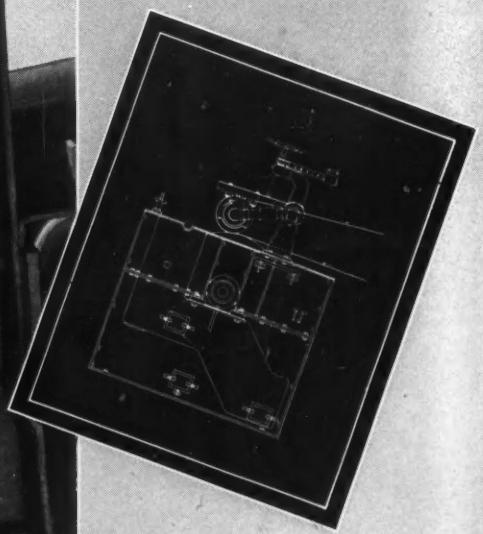

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**PAPER TRADE JOURNAL**

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(NEWS ITEM: *The Container Industry has found a new use for Paper—in screw cap construction—and expects to use 23 million pounds of paper annually for this purpose.*)

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Every day, American industry is finding new uses for paper—paper cans for paints . . . paperboard containers for tooth paste . . . molded fiber for alarm clock cases . . . paper twine for wrapping. These new uses call for new standards of lightness and toughness, new standards of quality in performance. New responsibilities—new opportunities for the Pulp and Paper Industry.

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Vol. 122, No. 1

PAPER TRADE JOURNAL

Title Reg. U. S. Pat. Off.

January 3, 1946

# Expects Larger Output of Cheaper Papers

## Midwest Market Reports OPA May Grant Some Price Increases To Stimulate Production of Much Needed Cheaper Grades—Doubt Exists Whether Or Not Higher Price Must Be Absorbed By Trade.

[FROM OUR REGULAR CORRESPONDENT]

CHICAGO, Ill., January 2, 1946—There is a growing conviction among members of the trade locally that the various government bureaus will begin shortly to stimulate the movement of cheaper grade papers. There are several ways this could be done, say local reports, but perhaps the fondest hope of these who have been consistently deploring the "unevenness" between cheaper and more expensive grades is that the Office of Price Administration will grant some much needed increases here and there. It seems a foregone conclusion that the cheaper grades will not move until price levels are corrected to meet increased costs and marked inequities between various grades. Whether or not this price jacking up, if it does come, could be reflected in the price to the ultimate consumer of paper is still a matter of conjecture. Taking the experiences of over-all retailing as an example, the paper dealer at the so-called "retail level" is not currently as optimistic as the mill representative.

Specifically, all local markets remain unchanged as the old year slides by. While there is no apparent reason for real optimism, certainly as far as the first quarter of 1946 is concerned, the industry does expect most grades to be back to from 50 to 75% of normal in 1946 with an actual surplus in a surprisingly large number of grades come one year from now. Inasmuch as volume seems to be the answer to many problems, including price squeezes arrived at through the OPA cost-absorption policy, there seems to be hope in such an analysis.

### Paepcke to U. of C. Board

Walter P. Paepcke, president of the Container Corporation of America and head of the Chicago Community Welfare Fund program now drawing to a successful close, has recently been elected a member of the board of trustees of the University of Chicago. This recognition will be of interest to the many who have watched and respected the rapid business development and civic contributions of the Container head.

### New Concern Moves to New Address

A newly organized Chicago paper concern, Strang & Son Paper Company, has recently moved to a new location at 2521 Archer avenue on Chicago's near southwest side. The company will carry products manufactured by the Tanglefoot Company, Morgan Paper Company, Div., White-Washburne Company, Inc., the Victoria Paper Mills and the Hoberg Paper Mills. A broad and representative line will include wrapping papers, paper cups, tissues, napkins, gummed tape, towels, insecticide sprayers and toilet seat covers. The company, incidentally, has just been elected to a membership in the rapidly growing Chicago Paper Association.

### New Association Members

The new Illinois State Paper Merchants Association last week reported the acceptance of a new member, the Cain Paper Company of Peoria. The Paper and Twine Association has just reported memberships for Lt. Colonel John E. Beier of Beier & Company and Major E. H. Wolfberg, head of A. W. Mendenhall Company.

### Salesmen Defer January 7 Luncheon

The western division of the Salesmens Association of the Paper Industry, having had two outstandingly successful programs in December, will forego the customary Monday noon luncheon on December 31 and resume its noon day programs on January 7 at the Hotel Sherman, as usual. No special program has been devised and the meeting will be devoted to a discussion of the outlook for the first quarter of 1946.

## Container Enlarges Fernandina Mill

CHICAGO, Ill., December 31, 1945—Container Corporation of America, will add a paperboard machine, power plant and necessary buildings to its Fernandina, Fla., pulp mill. The new unit is a Fourdrinier paperboard machine trimming 160 inches and has incorporated in its construction all the latest in improvements and design. No effort has been spared to make this one of the finest paper mills in the South. The present plan calls for no appreciable increase in pulp producing facilities. It is contemplated that the Fernandina plant, when completed, will ship pulp as well as paperboard.

As Container Corporation is one of the largest users of Kraft paperboard, it will continue to purchase substantial tonnages of Kraft board from other mills in addition to consuming its own production of that grade. The Rust Engineering Company, of Pittsburgh, Pennsylvania, are the engineers on the project and will act as general contractors in construction and equipment installation.

C. R. Hunsicker is plant manager; A. H. Stier is assistant manager and timber operations manager; and R. E. Phinney is chief engineer at Fernandina.

# Canadian Industry Is in Good Position

## Exports of Newsprint and Pulp In November Show Substantial Gain While Other Exports Declined 23 Percent Below 1944 — Largest Capital Outlay On Plants In Years In Prospect for 1946.

MONTREAL, Que., January 2, 1946—Indicative of the favorable position of the pulp and paper industry in the post-war economic picture of Canada is the fact that while the total value of the November export shipments from Canada dropped by 23.6% as compared with those of November, 1944, those of pulp and paper showed a substantial gain in the same comparison, newsprint moving up to $18,064,000 from $14,015,000 in the corresponding month of 1944, while the total value of newsprint exports for the 11 months, ended November advanced to $163,610,000 from $145,011,000. With the increase in price of $6 per ton with which the New Year starts, and the increased rate of shipments as calculated on present prospects, it is felt that the year 1946 is destined to break all records in the industry. After the vicissitudes attending the industry in the decade preceding the war, and six years of intensified effort against great odds during the war to keep production up to requirements, the feeling is that the industry is "out of the woods" at last and that in the reconstruction period it will figure in even more important degree as one of the main bulwarks in the peacetime economy of the nation and the source from which some half million Canadians obtain their livelihood.

More favorably situated as regards prospects than any other large-scale manufacturing industry in the country, the industry starts out in the post-war period with no major reconversion problem to deal with. Furthermore, with the exception of a certain amount of deferred maintenance, its plants are in reasonably good shape. Such minor reconversion problems as have now to be dealt with are mainly favorable factors. They include reconversion to secondary purposes of large blocks of hydro-electric power diverted to war industries and now released; diversion back to the industry of manpower which had been drained away by the armed services and war industries; and the return to the research and technical staffs of many able men hired by or loaned to the Government for the duration. Again, instead of having to rebuild markets for its products, the industry starts out with insistent demands for its products in assured markets.

### Expect Record Capital Outlay

One aspect of the industry which now seems assured is that during 1946 the biggest program of capital outlay on plants in many years will be undertaken. Every mill has its own post-war plans, which include new equipment and in many instances new lines of production altogether. A feature is that American capital is moving into the pulp and paper manufacturing field in Canada in a big way. Several of the largest pulp and paper organizations in the United States have vast projects under way in Canada for the founding of completely new industries and some new towns for the manufacture of pulp and pulp products, notably the Marathon Paper Mills Company, the Kalamazoo Vegetable Parchment Company, the Kimberly-Clark Corporation, and the Ontario-Minnesota Pulp and Paper Company. In addition large amounts of American capital are being invested in the expansion of established Canadian companies.

### Recommends "MM" Plan

The Montreal Club of Printing House Craftsmen has forwarded a resolution to the Canadian Pulp and Paper Association recommending the adoption by paper manufacturers of a single common basic count and sheet size, namely 1,000 sheets of 1,000 square inches, for all grades of fine and wrapping papers. Copies of the resolution have also been sent to clubs in Toronto, Ottawa, Winnipeg and Vancouver for similar action.

### May Send More Newsprint to Britain

Arrangements have been made for an early renewal of negotiations with the British Government with a view to increasing the supply of Canadian newsprint for British newspapers. The matter was recently the subject of a lively discussion in the British House of Commons, where there was considerable criticism of the British Government's action in reducing contracts calling for imports of 224,000 tons of newsprint from Canada and Newfoundland in 1946 to 50,000 tons, in order to conserve dollars.

The case for added supplies of paper for books, newspapers and periodicals was set forth at length, one contention being that increased supplies of newsprint would permit fuller publication of Parliamentary and other doings. (The daily newspapers are now being kept to 4-page issues). As to book paper, K. Lindsay, M.P. for the English Universities, said that 44,000 standard books were out of print and 8,000 manuscripts were waiting to be printed. He added that practically all European countries were without supplies of British educational books and Canada was lost as a market.

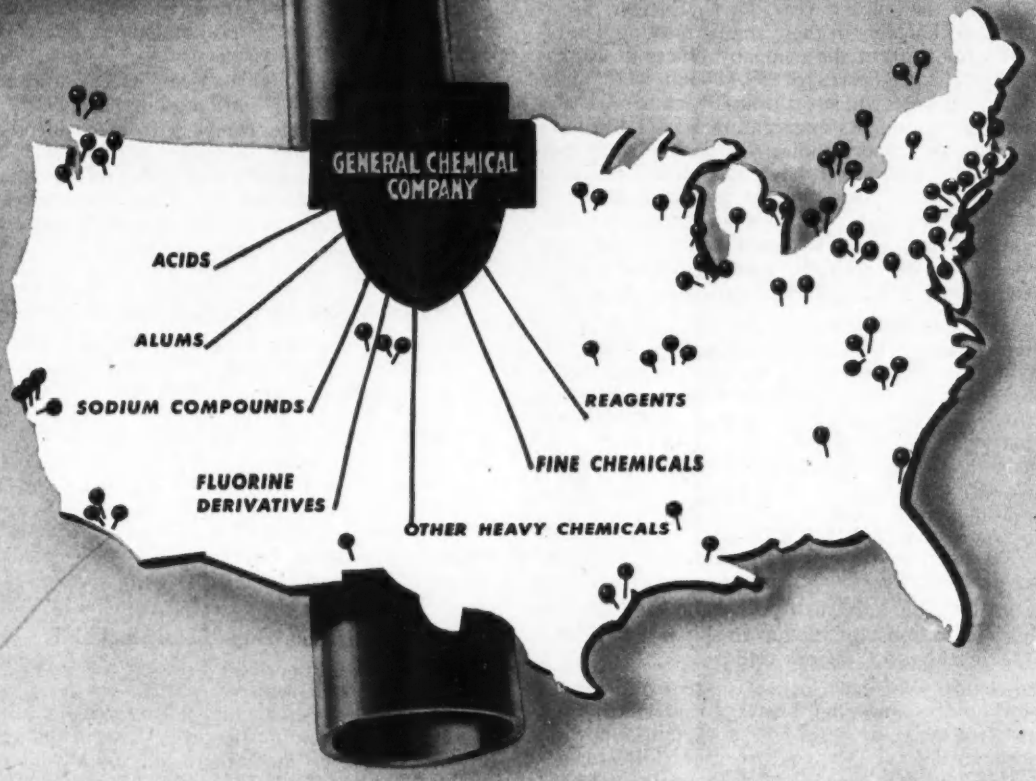
Ellis Smith, Parliamentary Secretary for the Board of Trade (the Government's Trade and Commerce Department) promised that increased supplies of newsprint for Britain would be reconsidered shortly. He gave no indication of where the additional supplies of paper would be bought beyond saying that the situation depended largely on developments in Northern Europe, where shortages of labor and transport and limited fuel production are obstacles. He added that there was a general shortage of supplies of foreign newsprint available for export.

### Rail Shipments of Paper Heavy

Canadian railways have so far recovered from the congestion which prevailed several months ago that shipments of paper and pulp are now going forward smoothly. As illustrating the important part that the railways play in the trade, the Canadian National Railways report that during 1945 more than 80,000 carloads of newsprint and other paper and pulp were transported by the system, representing a total of more than 2,700,000 tons. Figures for the Canadian Pacific Railways are not available, but as the C.P.R. taps the main producing areas, they must be on a

*(Continued on page 24)*

# *Supply Line for American Industry...*

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# Marathon Pulp Mill in Canada Progressing

## Sulphate Plant At Marathon, Ontario, Will Make Shipments of Pulp This Year — Expenditures On Project Through October Amounted To $8,444,380 — Strike Hits Mosinee Logging Camp.

APPLETON, Wis., January 2, 1946—Construction of Marathon Corporation's sulphate pulp mill and town site of Marathon, Ontario, Canada, is progressing rapidly and shipments of pulp will be made from there during the coming year, D. C. Everest, president, told stockholders at their annual meeting Thursday, December 20, at the company offices at Rothschild, Wis. Expenditures of $8,444,380 were made on the mill and town site through October 31 and additional commitments aggregating $2,671,496 have been made, the report indicated. The original cost estimates, the report said, have had to be revised in view of increasing costs and the project is expected to cost approximately $17,500,000 when complete. However, estimates of the capacity of the mill have also been revised upwards. Earlier estimates of a daily output of 250 tons have been increased to 300.

Mr. Everest's report was optimistic, predicting constantly expanding activities during 1946 for Marathon and its subsidiaries. It forecast an increase in sales despite the loss of a considerable volume of government war orders. New items, it stated, should add materially to sales and profits. Marathon's part in the war was summarized! 994 employees in the service, 30 of whom died; packagings for many items needed on the battlefields, produced in company plants; more than 1,000,000,000 war packages, plus 8,500,000 pounds of overwrap materials produced during the war years; an estimate that more than 50% of all of the laminated cellophane bags used in packing "K" rations and cartons to ship nearly 2,000,000,000 cartridges of various calibers.

One change was made in the board of directors at the stockholders' meeting. Lester Armour, Chicago, who was recently discharged as a captain following overseas naval service, was returned as a director after an absence of several years. He replaces Philip D. Armour, also of Chicago.

Officers were reelected at the directors' meeting: Mr. Everest, president; John Stevens, Jr., Leo E. Croy and Allen Abrams, vice presidents; A. M. Van Douser, secretary-treasurer; R. M. Altman, assistant secretary-treasurer, and F. P. Johnson, controller. Mr. Croy resides at Neenah, Wis., all the others at Wausau.

Directors include: Messrs. Everest, Stevens, Abrams, Armour, Croy and A. P. Woodson, J. S. Alexander and C. S. Gilbert, Wausau; M. P. McCullough, Chicago; L. F. V. Drake, New York City, and C. J. Winton, Jr., Minneapolis, Minn.

The regular quarterly dividend of $1.25, or 5%, was declared on preferred stock on record as of December 20, payable January 2, and 25 cents, the equivalent of 8%, on common stock at par value, payable on February 10, to stock on record as of January 31, 1946.

It was also decided to change the time of the annual meetings to January.

Net sales amounted to $31,940,697, an increase of $2,084,666 over the previous year. Increased costs, plus fixed ceiling prices at which a large proportion of sales, including approximately $5,000,000 in government business, was made, reduced the net profit, after taxes, to $1,360,437, a decrease of $242,579 from the previous year. Income taxes, including $3,407,762 in excess profits tax, amounted to $4,241,673 during the past fiscal year.

A supplementary report to employees showed total income of $32,337,815 and outgo of $23,249,053 during the year. Income received from dividends, interest, rents and other sources totaled $397,117. Principal items of expenditures, the report showed, included $17,439,726 for materials and services and $7,728,326 in wages and salaries. Wages represented an increase of $716,756 over the total paid the previous year.

### Work on Neenah Co. Addition Progresses

Work on the $90,000 addition to the Neenah Paper Company, Neenah, Wis., is progressing rapidly in spite of extreme cold and heavy snow. The columns for the second story are up and beams and floor forms are being placed. The all-concrete building will be four stories. Pouring of concrete for the columns, beams and floor is expected to start the week of January 7. Concrete was poured several weeks ago for the first floor.

Outside walls, of brick, will not be started until the concrete skeleton is ready.

### Roddis Co. Buys Mosinee Lands

The Roddis Lumber and Veneer Company, Marshfield, Wis., and Ironwood, Mich., has announced purchase of the Michigan holdings of the Mosinee Paper Mills Company, Mosinee, Wis., including 10,000 acres of forest land, a sawmill and all the inventory on hand at the latter company's sawmill operations at Ironwood, Mich.

The deal was negotiated in the offices of J. D. Mylrea, Wausau, Wis., who is a director of the paper company and who was in charge of the company's logging and lumbering operations at Ironwood.

Purchase price was not disclosed. Included in the deal is the stipulation that the Marshfield firm will furnish the Mosinee mill with considerable more than the equivalent in market price of the hemlock logs and pulpwood when cut from the tract within a given period of time. Timber on the tract is mostly hardwood, with some hemlock and pulpwood.

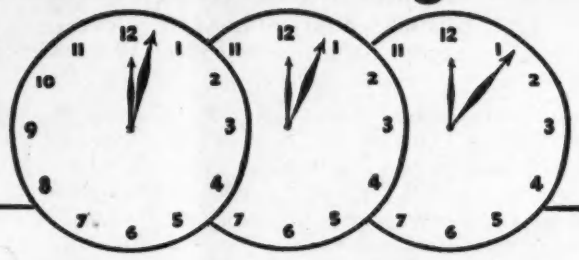
### Strike Hits Mosinee Logging Camp

A strike involving 121 members of Local 15, International Woodworkers of America (CIO) was launched December 28 in a logging camp operated by the Mosinee Paper Mills Company, Harold E. Arnold, local union president announced December 29 at Wakefield, Mich.

The union charged the company refused to "comply with a War Labor Board directive ordering a 10

*(Continued on page 46)*

# How to Cut Metal Cleaning Time to MINUTES



## NEW, FAST-ACTION DETERGENT CLEANS FERROUS AND NON-FERROUS METALS...Easy to Handle

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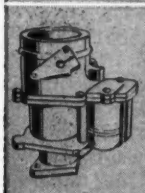
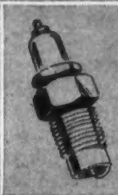
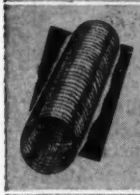


**CARBURETORS**—Solvent "26" removes gum, gasolene sediment and other accumulations of dirt.



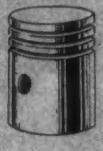
**SPARK PLUGS**—Solvent "26" safely cleans porcelain; helps loosen carbon deposits.



**METAL PLATES AND SCREENS**—Solvent "26" restores clear, clean finish to any metal surface.

**DIES AND STAMPING**—Solvent "26" removes drawing compounds from die-formed or stamped metal.

**LABORATORY EQUIPMENT**—Solvent "26" frees glass and metal tubing and their supports of gums, varnishes and other incrustations or deposits.



**PISTONS**—Removes lacquers, gums, resins, etc. from gas, gasolene and diesel engine pistons and rings. Also effective for cleaning all parts of dismantled motors, engines and machinery.

**REMOVES:**

Oil • Grease • Gums • Varnishes • Lacquers • Paints
Carbonaceous Deposits • Asphaltic Products

**FROM:**

Steel • Cast Iron • Aluminum • Porcelain • China
Chrome and Nickel Plate • Stone • Precious Metals
Brass • Washable Fabrics

Used throughout the war in critical industry as a superior cleaning agent, newly-developed SOLVENT "26" is now available for all industrial needs.

Offering many advantages in time, labor and cost over other present cleaning methods . . . Solvent "26" is so effective a detergent it can be used at *ordinary* room temperatures.

The fast action of Solvent "26" reduces cleaning time from hours to minutes on dismantled engine parts and all kinds of machinery. Simply dip, rub, brush or spray it on. Then flush clean with hot water.

Mail the coupon today for literature and information leading to a demonstration of this unique product in your own plant.

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Gentlemen: I am interested in a demonstration of Solvent "26"—at no cost or obligation.

Name.....
Title.....
Company.....
Address.....
City.....State.....

# National Printing To Buy Worthy Paper Co.

## President Bliss of Worthy Paper Co. Fails To Confirm Report But Business Sources Declare Deal Is Near Completion — Workers Accept Strathmore 8-Cent Wage Offer — Other N. E. Mill News.

SPRINGFIELD, Mass., January 2, 1946—The National Printing Company of Thompsonville, Conn., in which John Gerich and George Ronaldson are partners, is reported in business circles here to be purchasers of the Worthy Paper Company of North Agawam recently placed on sale by Gorham Bliss, president and owner. While officials of both concerns met inquiries on the matter with the reply that no announcement of final action was ready at this time, the report was not denied and, authoritative business sources said the transaction was nearing formal settlement.

When asked if the National Printing was the purchaser of his business, Bliss said, "Perhaps. We are not ready to say. Until a deal is a deal it is merely a story."

Gerich, treasurer of the Thompsonville concern, acknowledged that National Printing was interested but declared any comment at this time "might be premature." He said the printing company was having auditors make a check of the Worthy's books and declared the transaction had not reached the point of arriving at a price or making any deposit and that any official announcement would not be in order for two or three weeks.

The Worthy Paper Co. owned for years by the Bliss family, was put on the market by the present owner, as an aftermath of a decision by employes of the company to ask for collective bargaining on wages through the International Brotherhood of Papermarkers, AFL. Bliss said at that time that the decision would mean the Worthy would lose its individuality of workmanship and production in its line of fine paper manufacturing and he did not care to continue operation of the business under the circumstances. He announced that the company would be for sale as of that date.

### Workers Accept Strathmore Wage Offers

Acceptance of Strathmore Paper Company's offer of an eight-cent hourly wage increase by AFL employees of the company's four plants in West Springfield and Woronoco, had brought to an end a wage dispute of more than a month. At a special meeting held at Moose lodge hall, Westfield, Tekoa local, International Brotherhood of Papermakers, voted to accept the company's compromise offer of an eight-cent increase for all hourly employees retroactive to Dec. 10. The company's four plants employ 350 workers. Original demand by the union for a 15-cent increase was met by management with an offer of five cents. This offer was flatly rejected by the union and negotiations were continued.

Fred Rochford, AFL papermaker's organizer, pointed out that the eight cent increase agreed upon represents almost exactly the amount necessary to conform to the latest cost of living index issued by the government.

"In view of the fact that the increase is slightly higher than has been given by some of the other paper mills in the New England area," he continued, "the union has agreed to sign the labor agreement for a full year, running to December 1, 1946, rather than to June 1 as has been the former termination date of the contract."

Incorporated into the new contract also will be features agreed upon earlier in the year and several other contract changes. These include the general three-cent hourly raise which became effective April 1, three holidays off with pay and a shift differential for all tour workers which went into effect June 1 and provides four cents an hour for the second shift and six cents for the third shift.

### C. G. Neidel to Handle N. Y. Sales

The American Writing Paper Corporation of Holyoke has announced, that, effective January 1, Charles G. Neidel, Western New England sales representative, will also be their representative for New York state and Western Pennsylvania. Neidel came to the company in 1919 and during the past 26 years has served in many sales and administrative capacities.

### Stevens Workers Given 5% Bonus

Employees of the Stevens Paper Mill, South Hadley Falls, were given a Christmas bonus which included 5% of their wages for the past year. Returning servicemen who have been reemployed were given a $100 bonus. The company recently granted its employees a ten cents-an-hour increase in wages, with an additional four cents per hour for the middle shift and six additional cents for the night shift workers.

### Carew Co. to Make Paper for President

President Truman's personal "thank-you" note to the 12,000,000 men and women who fought World War II for the United States will be inscribed on paper manufactured here. The Carew Manufacturing company of South Hadley, which manufactures highest quality writing paper, has been commissioned to make the entire amount necessary for carrying out the President's idea of a "testimonial of appreciation" to each honorably discharged member of the U. S. fighting forces, men and women, who served. Courtland B. Griffin, of Longmeadow is president of the company. The testimonial, expressing appreciation of each individual's services will carry the presidential seal.

### White and Wyckoff Workers Get Bonus

Employees of White and Wyckoff, Holyoke, received a week's extra pay for Christmas bonus.

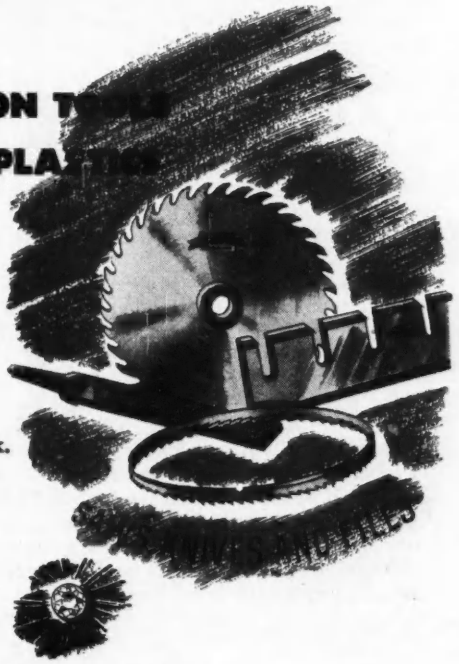
## IPI Names Weymouth in Chicago

Fred A. Weymouth has been named the new manager of International Printing Ink's Chicago Factory.

The assistant factory managership vacated by Mr. Weymouth will be filled by Charles Rietz, former head of IPI's varnish laboratory and head of varnish production. F. Jack Jeuck, former factory manager, is now IPI's Western District Manager.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

## YOU WILL NOW FIND THIS MARK ETCHED ON ALL THESE FINE PRODUCTION T[illegible] FOR CUTTING METAL, WOOD, PAPER, PLA[illegible]



From now on, all Simonds Saws for cutting wood, metal, and plastics... all Simonds Machine Knives for cutting wood, veneer, and paper... all Simonds Red Tang Files... all Simonds steel and steel specialties... *every one* of these first-quality products will bear the same mark of family-identity you see above. And a like mark will also identify the products of Simonds Abrasive Company of Philadelphia (formerly the Abrasive Company), of Simonds Canada Saw Company, and of Simonds Steel Mills at Lockport, New York.

So now, when you want fine tools for cutting and grinding, this ribbon-etch... signature of America's longest experienced firm of sawmakers... tells you at a glance: "There's no finer tool made in this line... *anywhere.*"

**SIMONDS** rhymes with diamonds

...and Simonds Tools cut with diamond-like smoothness and precision. Order from your Industrial Supply Distributor or dealer, or write the nearest Simonds office:

**BRANCH OFFICES:** 1350 Columbia Road, Boston 27, Mass.; 127 S. Green St., Chicago 7, Ill.; 416 W. Eighth St., Los Angeles 14, Calif.; 218 First St., San Francisco 5, Calif.; 311 S. W. First Ave., Portland 4, Ore.; 31 W. Trent Ave., Spokane 8, Washington.
*Canadian Factory:* 595 St. Remi St., Montreal 30, Que.

# Thunder Bay District Developing Rapidly

## New Kimberly-Clark, Marathon, and Brompton Mills Indicate Large Industrial Development In This Region—Vocational Training Plan Will Aid War Veterans—Formal Paper Rationing Ended.

[FROM OUR REGULAR CORRESPONDENT]

TORONTO, Ont., January 2, 1946—Thunder Bay district seems destined to be one of the most important pulp and paper sections of the Dominion. In a year or two, when the new Kimberly-Clark Long-Lac development is in full swing, along with the new Marathon development and the Brompton Pulp and Paper Company's new mills at Red Rock, now in production and expected to be going all out next year, the aggregate operations will add materially to Canada's already enormous production of pulp and paper. All this new production will require more and more skilled and unskilled labor and to take care of some of this demand Provincial Paper, Limited, is planning to instruct ex-service men as woodsmen under the Canadian vocational training scheme. This plan is being watched by other companies in view of the growing need for pulp and paper products and the chronic shortage of manpower in woods operations.

A. G. Poundsford, general manager of Provincial Paper, has arranged with the district supervisor of training, provincial department of labor, to place volunteers among veterans at the company's camp north of Hurkett. About 80 German prisoners of war were employed there until a few weeks ago, which led to protests on the grounds that some veterans could not get employment in the woods.

Despite assurance from Dominion Selective Service officials that the protests were unfounded, Mr. Poundsford cleared the prisoners from the camp and made arrangements for the vocational training experiment.

The men are being placed on the company's payroll for the first month at $3.25 a day, less 95 cents for board, and will be guaranteed $100 a month in the case of single men and $120 in the case of married men, plus allowances for dependents. The differences between what the men receive from the company and their minimum guarantee, will be paid by the government.

The assistance plan has been followed for some time in industry in cases where veterans are given employment as apprentices; but it is a departure in the woods industry, which needs 10,000 to 12,000 woodsmen annually.

The minimum first month's allowance compares with $2.50 a day for German prisoners, but the government bonus will put the veterans in a much better position. At the end of a month it is expected that a man will be able to earn more than $120 a month. He will be given an opportunity to go on a piecework basis as soon as he is cutting sufficient wood.

Members of the Lumber and Sawmill Workers' Union, meeting at Port Arthur recently, took the position that the scheme would provide "an indirect subsidy" to an industry which did not need it.

### More U. S. Newsprint Aids Book Mills

Indicative of the promising future of the pulp and paper industry in Canada is the present peculiar situation which has developed as a consequence of the decision of Canadian newsprint mills to increase shipments to the United States. With increased newsprint supplies from Canada, U. S. mills can divert more production to book papers for the increasing circulation of magazines. A considerable proportion of the increased circulation of most of the larger magazines, along with some new ones planned, will go to the Canadian field. At the same time, users of book papers in Canada are experiencing a continued shortage of supplies. Result: Canadian publications cannot expand, while their competitors from across the line are making ambitious expansion plans for the Canadian market.

### Formal Paper Rationing Ends

As of the year end, formal paper rationing ends in Canada. A system of "mill allocations" will take its place. The newsprint mills have allocated to Canada 210,000 tons, against 187,000 tons in 1944 and 200,000 tons in 1945. The book paper mills will allocate supplies to their customers in proportion to previous deliveries. No substantial increase in supplies is available; book and magazine paper machines are operating to capacity now. The mills have been able to improve quality and basic weight of magazine paper but not to increase yardage.

Expected reductions in the use of book papers have not materialized with the end of the war. The reduction of the use of paper by government agencies has been offset by new government developments, such as children's allowances (commonly referred to as the baby bonus), unemployment insurance, etc. While exports have been decreased, imports have been disappointingly low. Some hope is seen in the installation by Provincial Paper Mills of new coating capacity, which will increase production by around 4,000 tons a year—if paper is available. At the moment Provincial is short of paper stock to put through the coating baths. Other mills may follow the lead of Provincial and increase coating capacity.

### Subscribers Must Wait

It is stated that some Canadian publications have backlogs of up to 25,000 would-be subscribers and no immediate likelihood of being able to accommodate more than a small fraction of them.

John Atkins, under whose direction the non-essential use of paper was cut to a minimum in Canada during the war years, tendered a luncheon to his top executives December 27, prior to his retirement as administrator of the publishing and printing industries under the Wartime Prices and Trade Board. Mr. Atkins thanked the industry as a whole for its co-operation in what he termed a difficult job. He set the newsprint quotas for newspapers and periodicals. While all controls under which he operated are revoked as of December 31, he will carry on with a skeleton staff in clearing up the odds and ends, at the special request of W.P.T.B. Deputy administrator Travis A. Tod presented Mr. Atkins with a copy of Maurice Olivier's book on the British North American Act, "Problems of Canadian Sovereignty".

# Vision in Hydraulics

DRAW back the curtain of history—1875—an inventive man, S. Morgan Smith, putting the finishing touches to the model of his first turbine—one of the few machines of its type to prove successful in the early days of hydro development in the United States.

The 70 years which have followed constitute a period of bold and amazing achievement in human progress. And the business which bears his name has kept pace with engineering advancement and is today a testimonial to the intellect, inventive genius and sound vision of the Founder!

*If It's Hydraulics— Put It Up to Us!*

**S·MORGAN SMITH COMPANY** YORK·PENNSYLVANIA·U·S·A·

**POWER by SMITH**

## Oregon Company Buys Timber Land

SALEM, Ore., January 2, 1946—Purchase of all the timber holdings, logging and lumbering operations and equipment of the Charles K. Spaulding company was announced recently by the Oregon Pulp & Paper Company. The announcement was made by E. A. Linden, manager of the lumbering division of the paper company, who declined to mention the purchase price, but reliably it is reported the price paid was well above $400,000. The transaction is one of several important deals made by Oregon Pulp & Paper Company in recent months, aggregating possibly $1,200,000 in new investment, counting the cost of reconstruction of the Salem paper mill following the fire early this year.

Another important announcement from the company was made by Nels Teren, vice president and general manager of the company. He said the Salem paper mill, down most of the time since the fire, should resume operations by February 1. Strikes and restrictions on materials have delayed the rebuilding and wood room that were destroyed. The mill operated for a few weeks after the fire with pulp furnished from elsewhere. The rebuilding represents an expenditure of around $350,000. The walls of the digester building are being made of aluminum and equipment is being modernized and some new mechanism added.

Some expansion is being done at Vancouver where, under the same ownership, are a paper mill and lumber mill. The paper plant there, known as Columbia River Paper Mills, is seeking from the city the vacation of a street for a proposed addition to the plant to house a converter.

## Conestoga Mill Ready to Start

GIRARD, Pa., December 27, 1945—The Conestoga Paper Mill, recently constructed at Elk Park, will start production of corrugated paper pasteboard after the first of the year, it was learned today. Mrs. Chester Armentrout of Fairview, wife of the mill owner, said the mill would employ 16 to 20 men. The pasteboard will be sold to a box making factory. The two-story mill, approximately 50 by 100 feet, occupies the site of the old interurban street car line power house, which has been rebuilt and remodeled.

The Armentrouts came to western Pennsylvania about four years ago from Maryland. For two years Armentrout was superintendent of the Erie Concrete & Steel Supply Co., shipbuilding division, prior to going into business for himself.

## Bulkley, Dunton Pulp Promotes Egan

Roger J. Egan has been appointed vice-president of the Bulkley, Dunton Pulp Co., Inc. by Fred Enders, president. Mr. Egan joined the company in 1921.

During his 25 years' association with Bulkley, Dunton he has devoted his time to sales promotion work and mill relations. For eight years he was in charge of the company's Chicago office, covering the western sales territory.

Soon after Pearl Harbor Mr. Egan was invited to serve as eastern representative of some West Coast mills, and in view of the fact that this appointment involved work furthering the general interests of the industry, his company released him on a temporary leave of absence. Before returning to Bulkley, Dunton in 1944 he did valuable liaison work in Washington.

## Block Firm to Handle Paper Publicity

The public relations firm of Frank Block and Associates was announced this week. The new group will handle general accounts but will specialize in pulp and paper industry problems. It will have offices in New York and St. Louis. The firm is headed by Frank Block who was identified with four of industry's most successful major war campaigns. Mr. Block conducted the first waste paper campaign which began just before Pearl Harbor; the nationwide scrap drive as secretary of the American Industries Salvage Committee; the current nation-wide waste paper drive as director of the Conservation Committee of the Waste Paper Consuming Industries, and the U. S. Victory Pulpwood Campaign as director of the War Activities Committee of the Pulpwood Consuming Industries.

Associates are Jesse Siegel, John F. Kinerk and L. Daniel Blank. New York offices of the firm are located at 30 Rockefeller Plaza; St. Louis offices at 809 Ambassador Building.

## St. Regis Force Returns to Work

WATERTOWN, N. Y., December 24, 1945—Officials of the International Brotherhood of Papermakers (AFL), Local 45, said today that labor difficulties which halted production at the Deferiet plant of the St. Regis Paper Company had been settled and the men advised to return to work Wednesday. Spokesmen for the union declined to disclose the terms of the settlement and also would not discuss reasons for the walkout, which began a week ago.

John P. Burke, president of the International Brotherhood of Pulp, Sulphite and Paper Mill Workers (AFL), also represented at the plant, said last week that sixty members of the papermakers' union had walked out to enforce demands that all crews work either a forty-eight-hour or a forty-hour week. He said the company wanted to place some machines on a forty-hour week, leaving others on the forty-eight-hour basis.

Mr. Burke said the walkout of the papermakers made 300 employes idle. He said his union was not a party to the dispute.

## Lawson Pours First Castings

The E. P. Lawson Company has started production on the new Lawson Paper Cutter and is pouring castings and proceeding with the machine work necessary for the construction of their new paper cutting machine. Officials of the company visited the foundry recently to witness the event, and it is planned to have the new paper cutter ready early this year.

Many of the new ideas incorporated in the Lawson Cutter are the result of many years' experience by the members of the Lawson organization in paper cutter sales and service. Fred Seybold, Chief Engineed and an outstanding designer of paper cutting machines, has also incorporated many new developments including greater safety factors, improved clamping and shear angles, and modern streamlining assuring greatly increased production. The Lawson Paper Cutter will contain many new, patented features to provide precision cutting at a saving in labor.

The new Lawson Paper Cutter will be sold and serviced direct by the Lawson organization. In addition to their New York, Boston, and Philadelphia offices, sales and service organizations will operate in other printing and converting centers.

# OUR 100TH YEAR

1846

1946

# Perkins-Goodwin Co.

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CHICAGO, ILLINOIS

LUFKIN, TEXAS

STOCKHOLM, SWEDEN

## PULP AND PAPER

## Waterbury Container Starts New Plant

BRIDGEPORT, Conn., December 31, 1945—The Industrial Development division of the Chamber of Commerce, announces that work will start immediately on the Bridgeport plant of the Waterbury Corrugated Container company, which will cover 31,776 square feet, on Linden avenue, Stratford.

Designed by Fred Dixon, the one-story factory consists of three connected sections: the main factory, 100 by 300 feet; an El for the boiler room, covering 1200 square feet, and another wing, 48 by 12, which will be used as lounge and rest rooms for employes. The monitor type unit will be built by the Frouge Construction company, of which Thomas Frouge is president, and John Frouge, secretary. A roadway, 80 by 50 feet, will be used in connection with loading and unloading from a spur track of the New York, New Haven, and Hartford railroad, which will expedite shipping for this addition to Bridgeport's area industries.

## Ruderman Buys Paper Mill Village

GOUVERNEUR, N. Y., December 31, 1945—Charles I. Ruderman, Gouverneur industrialist, has purchased the paper mill village of Piercefield. He declined to say what he had paid for the property which is assessed at approximately $250,000.

The village, covering 783 acres, includes a paper mill, two churches, a store, commercial garage and about 80 houses. Mr. Ruderman bought it from the International Paper Company. Rights to the water power of the mill, however, were retained by Systems Properties Inc., a subsidiary of International Paper.

Mr. Ruderman said he was negotiating with a concern interested in using the mill. Piercefield once had a population of 1000, but the paper mill closed five years ago and now only half the houses are inhabited.

## Fabricon Moves to Bridgeport

L. O. Turner, president of the Fabricon Products Group, has disclosed the formation of a new Connecticut corporation to be known as Fabricon Products of Connecticut, Incorporated. This corporation has leased the former LeBaron plant on Hollister Avenue, Bridgeport. Transfer to this plant of the production facilities of Fabricon Products, Inc. of New York has been brought about by the inadequacy of space at the present location in Long Island City. Bridgeport offers the same convenient shipping advantages to all points now served. J. French Corder, manager of the present plant, formerly known as Waxed Papers, Incorporated, will become manager of the new Connecticut corporation.

## Barrows Represents De Laval

The De Laval Steam Turbine Company of Trenton, N. J. has appointed H. H. 'Hal' Barrows and his organization, the Industrial Equipment Company as sales representatives ,throughout the lower Michigan peninsula, for the IMO Pump and Worm Gear Divisions. Mr. Barrows is well-known in the Michigan area, where he has had wide experience in the worm gear and oil handling fields for over ten years. The Industrial Equipment Company has, for many years, been located at 6435 Hamilton Avenue, Detroit, Michigan.

## LongLac Site Has Good Supply

NEENAH, Wis., December 31, 1945—Further examination of plans for the construction of a new mill and town site in Canada by the Kimberly-Clark Corporation discloses that the concession centers in the village of LongLac. The community—on the Trans-Canada highway—is a junction point on the Canadian National Railways, located 150 miles northeast of Port Arthur and 250 miles northwest of Sault Ste. Marie.

The territory that Kimberly-Clark will open up contains a source of raw materials which company officials consider as eminently suitable for pulp to be used both in book paper and creped wadding products and, under modern forestry practice and sustained yield operation, assures a future supply of pulpwood for the new mill.

The findings of survey parties are now being studied and a definite mill and town site soon will be established. Winter headquarters are ready for operation at Schreiber, Ontario; it is expected that construction will be substantially completed in 1947 and that the installation of machinery will take place later that year.

## Stein Hall Shares Profits

Stein, Hall and Company Inc., 285 Madison Avenue, New York, celebrates 1946 as its eightieth year with the announcement of the adoption of pension and profit sharing plans for the benefit of its employees. The entire cost of the plans will be borne by the company. All employees who have been with the company for five years or more will receive, as past-service benefits, monthly pensions equivalent to three-fourths of one per cent of their present monthly salaries for each year of service. In addition the company will contribute to the fund annually, out of profits, an amount up to 15 percent of the payroll of these employees. This amount will be devoted to the purchase of life insurance as well as additional retirement benefits. The company will continue to pay the costs of present group insurance for all employees.

One of the unusual features, is that, if an employee leaves the company at any time and for any reason, all the funds deposited for him under the plans, including his insurance policy, become his immediately, Once deposited with the trustee, the company has no claim on these funds.

## Veterans Join Arthur D. Little, Inc.

CAMBRIDGE, Mass., January 2, 1946—The addition of eleven veterans to its staff was announced today by Arthur D. Little, Inc., industrial research organization. The veterans who had previously been with the company, their scientific field and former ranks, are Capt. Harry B. Wissmann, AUS, economist; Lt. (j.g.) Richard W. Hyde, USNR, chemical engineer; Lt. John T. Howarth, AUS, resin chemist; Lt. Robert I. Brown, USNR, chemical engineer; and M/Sgt. Ekkehard L. Kreidl, AUS, physical chemist and patent specialist.

Other veterans joining the staff are Capt. Harry M. Anderson, AUS, chemical engineer; Capt. Ernest C. Crocker, Jr., AUS, chemical engineer; Lt. Comdr. Donald E. Boynton, USNR, chemical engineer; QM 1/c Richard M. Adams, USNR, draftsman; MT/Sgt. John L. Sienczyk, USMC, chemist; and Chief MoMM George P. Douglas, USNR, maintenance.

*For 20 Years...*

1926

**The Norton Pulpstone Has Been an Important Factor in Groundwood Production**

In 1926 the first Norton Pulpstone was shipped on a commercial basis—following several years of field work with experimental stones. It was available in only a limited range of grit sizes and grades of hardness and its costly iron center had to be returned when new segments were needed. But it marked a new era in groundwood production.

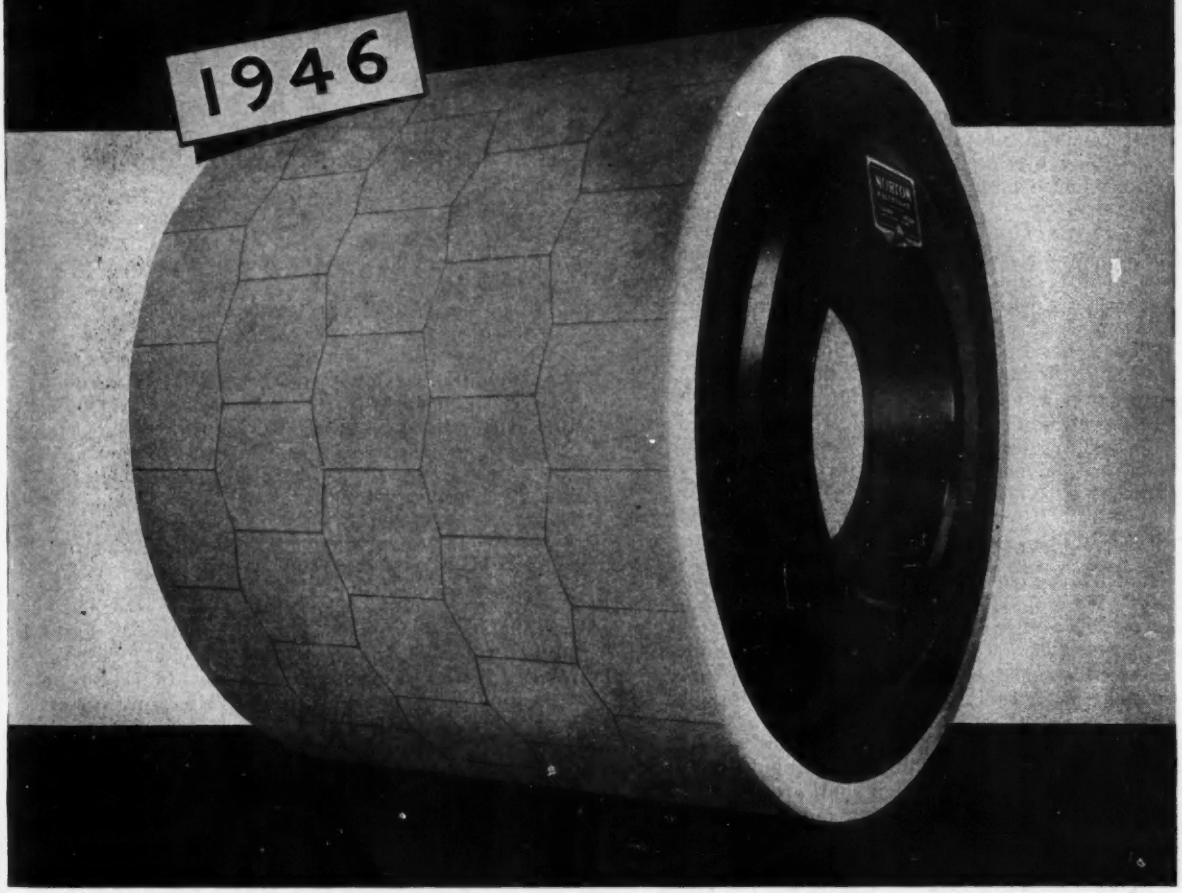
Today the Norton Pulpstone is available in Alundum, 38 Alundum and Crystolon abrasives, in regular and open structures, in a wide range of grit sizes and grades of hardness to meet the requirements of all types of groundwood mills. Its cement center of unique design is discardable and its cost is much less than that of the 1926 stone. Norton Pulpstones are in use today the world over—stones incorporating twenty years of continuous improvement.

**NORTON COMPANY**
**WORCESTER 6, MASS.**

Norton Company of Canada, Ltd., Hamilton, Ont.

NORTON ABRASIVES

1946



## Chemical Show to Disclose Advances

Forecasts of the 20th Exposition of Chemical Industries hold promise of the greatest industrial advances to come in the adventurous years of world reorganization now dawning. First of the major industrial displays to be held in Grand Central Palace, N. Y., since Pearl Harbor, the exposition will reveal many details of the important exploits in chemistry during the war, illustrating and suggesting their extension into new and wider civilian undertakings. Always realistic and practical, the forthcoming exposition is backed by the urge of the industrial leaders to turn away from destruction and resume their constructive careers. The exposition dates are February 25th to March 2nd.

Advance information from exhibitors indicates that the display will be replete with exhibits of special interest to chemists, chemical engineers, executives of industrial undertakings and others who will be among the visitors. Many new substances are coming into being, some of them to serve new purposes, others as alternates or replacements for older substances. Often such innovations are freighted with consequences of high economic importance.

From the standpoint of general interest, the exposition will cover practically every type of material and variety of equipment used in the conventional processing operations, from reduction by grinding, pulverizing, and so on, through the phases of separation, combination by emulsification, solution and the like, through treatments, purification and packing. There will be one or more exhibits typifying each of the major classes of operation, as well as conveyors, material handling equipment, bottling and packing services and equipment and a long list of miscellaneous equipment of special interest to plant designers, mill superintendents and other operating and supervisory personnel.

The week of the exposition will be the occasion for a number of professional gatherings, including the annual meeting of the American Paper and Pulp Association, running through the week; the Technical Association of the Pulp and Paper Industry, running from Monday to Thursday inclusive. The American Institute of Chemical Engineers will meet on Tuesday and Wednesday, and the annual award for major chemical achievement will be conferred at a banquet at the Waldorf Astoria on Wednesday.

The general public will be excluded and admissions will be by invitation and registration exclusively. The exposition will be open from Monday through Saturday, including evenings except Saturday. Charles F. Roth, president of the International Exposition Company is manager of the Exposition and E. K. Stevens, associate manager.

## Rivers Joins Elof Hansson

Karl E. Sundqvist, treasurer of Elof Hansson Inc., New York, and manager of the machinery department, has named Roy D. Rivers, well-known paper mill engineer as Hansson representative. He was previously employed by W. R. Grace and Company in their paper mill in Peru as well as by Industrias de Papel Simao S. A., Sao Paulo, Brazil. Mr. Rivers is leaving immediately by plane for Sao Paulo, where he is to establish a consulting and engineering office primarily in order to install and service American paper mill machinery in Brazil, but also in order to offer other technical service and advice among Brazilian paper mills.

## Powell River Receives Suggestions

VANCOUVER, B. C., January 2, 1946—Announcing award of a further $165 for suitable suggestions, the Labor-Management Committee of the pulp and paper plant of the Powell River Company, Limited, at Powell River, B. C., reveals that $2,785 has now been paid out by this joint committee for valuable suggestions turned in by employees for the betterment of operations in the plant.

One hundred dollars was awarded to Lloyd Roberts for his suggestion of using the Orange Peel Bucket in loading Limerock from the scow to the cars. Formerly this operation was carried on by lowering cars onto scow and filling same by hand, and then having the cars lifted by crane to the tram line.

Twenty-five dollars was awarded to Walter Hopkins for his suggestion to change the position of the doctor levers on paper machines numbers five and six.

Ten Dollars was awarded to Steve Drayton for his suggestion to provide brake on a Kelley Spruce Re-saw, to speed up changing Band Saws, while ten dollars was also awarded to A. Simard for his suggestion to remove the sharp turning in Broke Beater Partition.

James McCartney received five dollars for his suggestion of a safer method of changing the apron over the Pan Conveyor, and five dollars went to Harry Davies for suggesting a push button signal at Beater Room door for control of the high line. From this position the spotting and moval of trains can be accomplished with much greater safety to mill employees.

Five dollars was awarded to James Currie for his suggestion of installation of cord screw sash openers on high windows in the Cafeteria, and five dollars to John Turfus for his suggestion to enclose head of conveyor in boiler house to prevent larger material dropping off conveyor at the turn.

## Gair Project Heads Carolina Prospect

COLUMBIA, S. C., January 1, 1946 — Robert M. Cooper, director of the State Planning, Research and Development Board, reviewing the State's industrial progress during the year just ended, said that definite plans to spend more than $25,000,000 on new factories and expansions in South Carolina were announced during 1945.

Mr. Cooper pointed out that the Gair-Santee Corporation has combined with the South Carolina Public Service Authority to furnish one of the largest postwar industries—a $12,000,000 paperboard and box factory to be built 14 miles northeast of Orangeburg. Gair-Santee acquired the site and rights of operation through contract with the publicly owned power project, it was stated.

## Patrick Gallagher Retires

NEW ORLEANS, La., January 1, 1946—Patrick J. Gallagher, after 40 years with the Chase Bag Company here, has retired. Mr. Gallagher, oldest employe in terms of service in the New Orleans branch, came to the city in 1925 from St. Joseph, Mo., to help open the local plant. Since that date he has been foreman of the plant's manufacturing department.

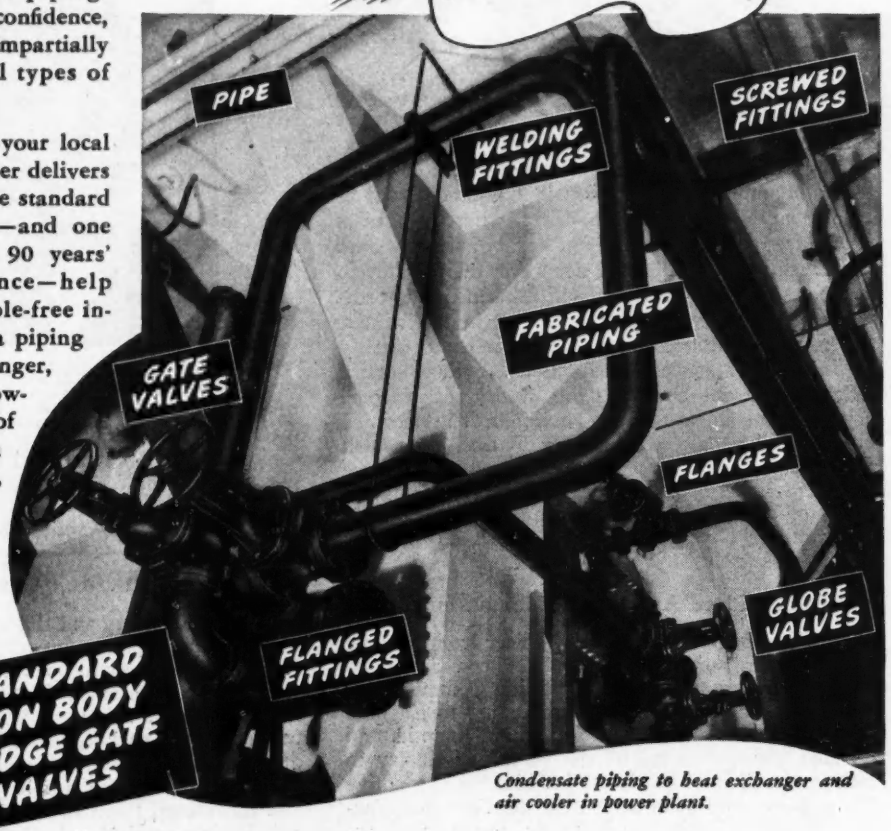
With 30 of his oldest associates at the Chase Bag Company, Mr. Gallagher was honored at a banquet at Tujague's restaurant last week. G. M. Conrad, company vice-president, presented him with a gold watch in recognition of his services.

# Piping Conversion *Simplified*... CRANE Supplies Everything

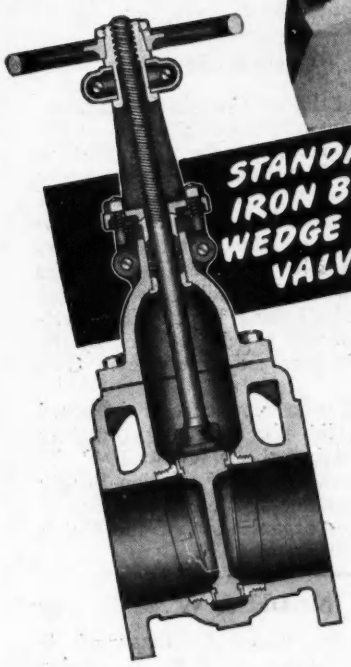
ONE SOURCE OF SUPPLY
ONE RESPONSIBILITY
ONE STANDARD OF QUALITY

• Whether your piping reconversion job is big or small, Crane is your logical partner to help get it done quickly. You select *all* materials from the world's largest line of valves, fittings, pipe, accessories and fabricated piping. You specify with complete confidence, for Crane can point out impartially the relative merits of all types of piping equipment.

Ordering is simplified—your local Crane Branch or Wholesaler delivers everything to the job. One standard of quality in every item—and one responsibility backed by 90 years' manufacturing experience—help assure time-saving, trouble-free installations. The result is a piping system that will operate longer, at highest efficiency and lowest cost. For one example of *complete* Crane lines in brass, iron, and steel valves, see below.




*Condensate piping to heat exchanger and air cooler in power plant.*




***SERVICE RECOMMENDATIONS:*** **Crane Standard Iron Body Wedge Gate Valves** are suited for many services in factories and power plants, at all working pressures up to 125 pounds steam. Brass trimmed valves are recommended for steam, water or oil lines; all-iron valves for oil, gas or fluids that corrode brass but not iron. Made in O.S. & Y. and Non-Rising Stem patterns. See page 101 of your Crane Catalog.

**WORKING PRESSURES**

| Size of Valve | Screwed or Flanged End Valves | | Hub End Valves |
|---|---|---|---|
| | Saturated Steam | Cold Water, Oil or Gas, Non-Shock | Cold Water or Gas Non-Shock |
| 2 to 12 in. | 125 pounds | 200 pounds | 200 pounds |
| 14 and 16 in. | 125 pounds | 150 pounds | 150 pounds |
| 18 to 24 in. | * | 150 pounds | 150 pounds |

*For steam lines larger than 16-in., Crane 150-Pound Cast Steel Gate Valves are recommended. (For sizes under 2-in., use Crane Clamp Gate Valves.)

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# CRANE

VALVES • FITTINGS • PIPE
PLUMBING • HEATING • PUMPS

## CANADA IN GOOD POSITION

*(Continued from page 8)*

comparable basis. While the bulk of the shipments have gone to the United States, a large amount was also sent overseas from Montreal, Halifax, Saint John, Quebec, and Vancouver ports and the remainder distributed throughout the country for domestic use. In addition considerable quantities go to destination direct by ocean steamships and canal boats. For years past the expenditure of the pulp and paper industry on transportation has amounted to a total of over $60,000,000 per annum.

### Baby Bonus Affects Woods Labor

While the situation as regards labor in the woods this season continues to be fairly favorable in Quebec Province, there is no longer any doubt that in Canada as a whole the supply of labor for woods operations is not keeping pace with increasing needs of an expanding industry. One reason for this, it is now generally admitted, is the federal Government's "family allowance" plan, now in effect, whereby parents of children receive monthly checks of from $5 to $8 per child (according to age) for their children. In the case of many farmers and fishermen who ordinarily go to the wood cutting camps in the winter, this represents more ready cash than they usually get from other sources—that is, where they have a flock of children—and with this steady cash income they are reluctant to take to the woods. The needs of this class of people, who largely live off their own land, are limited as regards cash, and they argue that there is no need for them to leave their farms and families for the winter season while they have cash coming in regularly that will see them through the winter season.

### Lt. Col. Roe Appointed Commissioner

Lt.-Col. Douglas Roe, lately officer commanding the Canadian Forestry Corps, has been appointed Canadian Government Forestry Trade Commissioner to London, England. Prior to proceeding to England he will be located in Ottawa for several months and will also make a survey of the forestry industry in Eastern Canada and British Columbia. He is a native of Vancouver and prior to joining the Canadian Forestry Corps in 1940 for overseas service was associated with the sawmill industry in British Columbia and from 1934 to 1940 was British Columbia's timber trade commissioner in the United Kingdom.

## Ecusta Plans 42-Hour Week

BREVARD, N. C., December 26, 1945—The Ecusta Paper Corporation and its two affiliated companies at Pisgah Forest will return to a 42-hour work-week schedule starting on or before February 1, and starting at that time a general increase of 15 per cent will be paid to hourly workers. President Harry Straus also has made known that in 1946 the companies will give all hourly employes with five or more years of continuous service a two weeks' vacation, instead of just one. Mr. Straus highly commended his employes for the "splendid production job" that had been done during the war and pointed out that approximately one-third of the companies' men and women in service have returned to work. The total number of employes in the armed forces was around 600.

## Bowmall To Handle French Purchases

The Office Professionel des Industries et des Commerces du Papier et du Carton, Paris, the official organization and representation of the French paper industry has entrusted Bowmall and Company, Inc., 250 Park avenue, New York, with the organization

CHARLES R. A. HARTIG

of the procurement of pulp and paper making machinery and equipment from manufacturers in the United States. Bowmall and Company, are maintaining a liaison office in Paris. Charles R. A. Hartig, executive vice president of Bowmall & Co., Inc., is in charge of French operations of this company.

## Sheldon Back with Union Bag

The Union Bag and Paper Corporation has announced the appointment of Walter Sheldon as Director of their board and pulp sales. Mr. Sheldon was released December 21st from the United States Navy where he served as a Lieutenant in charge of packaging and packing of all Navy textiles. He introduced standardization and simplification of containers greatly reducing the number of sizes required; he also introduced their automatic handling in palletized unit loads at the Naval Clothing Depot. The development of this program was closely followed by the packaging industry. He saw active service in Okinawa.

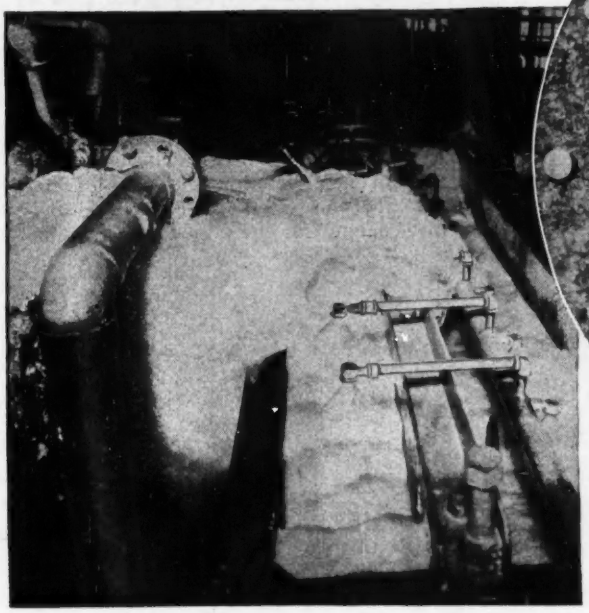
Mr. Sheldon has had wide experience in the board and corrugated and solid fibre shipping container industries. Prior to joining the Navy in 1942, he served with W.P.B. in the Office of Civilian Supply in charge of paper containers. He was previously connected with the sales organization of the Union Bag and Paper Corporation in 1939.

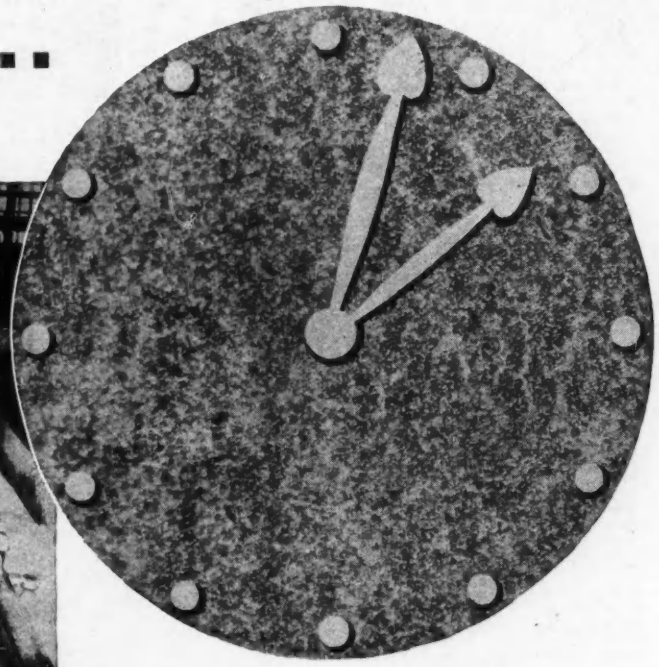
## Morian Joins H & W

Clarke H. Morian, Jr., joined Hollingsworth & Whitney Company on January 1, 1946, as a sales representative in the company's New York office at 230 Park Avenue. Mr. Morian is a graduate of Haverford College and for the last six years has been associated with the Cherry River Paper Company. He has specialized in the sale and service of converter papers and boards.

# GIVE NOPCO-KF 5 MINUTES

## to smash foam...





**... and improve sheet formation even at increased machine speeds**

FOAM in the head-box cut in two minutes? All bubbles cleared from the wire in five minutes? These are familiar occurrences in mills using NOPCO-KF in paper manufacturing. NOPCO-KF also saves labor by helping to prevent sticking at the presses.

Sheet formation is improved as a result of better fibre dispersion and foam control. Even in capacity operations NOPCO-KF proves the super "bubble-buster," dissipating entrained air—the common cause of thin spots—as if the stock were being handled at slower speeds. That's because NOPCO-KF keeps working on the wire.

### Thin Spots 75% Eliminated

In addition, NOPCO-KF helps reduce breaks, improve surface characteristics, increase water repellency. Valuable paper-making material is conserved. See what this chemical substance—expressly formulated to aid sheet formation—can do in your mill. Order enough for a trial run. Write, wire or phone.

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# NOPCO-KF

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NOPCO EVOLVED THRU RESEARCH

# FINANCIAL NEWS

## New York Stock Exchange

High, Low and Last for Week Ending December 29, 1945

STOCKS

| | High | Low | Last |
|---|---|---|---|
| A. P. W. | 8⅝ | 8½ | 8½ |
| Armstrong Cork Co. | 55 | 54 | 54¾ |
| Celotex Corp. | 24⅜ | 23¾ | 23¾ |
| Celotex Corp., pf. | 21½ | 20¾ | 20¾ |
| Certain-Teed Products Corp. | 15⅞ | 15 | 15 |
| Certain-Teed Products Corp., pf. | 110½ | 110 | 110 |
| Champion Paper & Fibre Co. | 50 | 50 | 50 |
| Champion Paper & Fibre Co., pf. | ... | ... | ... |
| Congoleum Nairn Co. | 34¾ | 34¼ | 34¾ |
| Container Corp. of America | 39½ | 38⅜ | 38½ |
| Continental-Diamond Fibre Co. | 16½ | 16 | 16 |
| Crown-Zellerbach Co. | 29¾ | 28¾ | 29¾ |
| Crown-Zellerbach Co., pf. | 108 | 107 | 108 |
| Dixie Cup Co. | 50 | 49⅜ | 50 |
| Dixie Cup Co.—A | 54¾ | 54½ | 54½ |
| Flintkote Co. | 37⅜ | 36½ | 36½ |
| Flintkote Co., pf. | 111 | 111 | 111 |
| Robert Gair | 10⅛ | 9½ | 9⅝ |
| Robert Gair, pf. | 19½ | 19 | 19 |
| International Paper Co. | 48¾ | 44½ | 48¾ |
| International Paper Co., pf. | 123 | 115 | 123 |
| Johns-Manville Corp. | 143⅝ | 140 | 143 |
| Johns-Manville Corp., pf. | 137½ | 136 | 137½ |
| Kimberly-Clark Corp. | ... | ... | ... |
| Mac Andrews & Forbes | 39 | 37¾ | 39 |
| Mac Andrews & Forbes, pf. | ... | ... | ... |
| Masonite Corp. | 59 | 57¾ | 58 |
| Mead Corp. | 23 | 22 | 22 |
| Mead Corp., pf. A—6% | 105½ | 105½ | 105½ |
| Mead Corp., pf. B—5½% | 104¼ | 103 | 104¾ |
| National Container Corp. | 31 | 29 | 29 |
| Paraffine Companies, Inc. | 76 | 76 | 76 |
| Paraffine Companies, Inc., pf. | ... | ... | ... |
| Rayonier, Inc. | 23½ | 21⅜ | 22½ |
| Rayonier, Inc., pf. | 38 | 37⅜ | 38 |
| Ruberoid Co. | 45½ | 44 | 44 |
| Scott Paper Co. | 57 | 55 | 57 |
| Scott Paper Co., pf. | 111½ | 111½ | 111½ |
| Sutherland Paper Co. | 40 | 40 | 40 |
| Union Bag & Paper Corp. | 25⅜ | 24⅝ | 25⅛ |
| United Paperboard Co. | 12½ | 12 | 12¼ |
| U. S. Gypsum Co. | 115½ | 112½ | 115½ |
| U. S. Gypsum Co., pf. | ... | ... | ... |
| West Virginia Pulp & Paper Co. | 38½ | 37½ | 38½ |
| West Virginia Pulp & Paper Co., pf. | 113 | 112½ | 113 |

BONDS

| | | | |
|---|---|---|---|
| Abitibi Pulp & Paper Co. 5s '53 | 106 | 105¾ | 106 |
| Celotex Corp. 3¾s '55 | ... | ... | ... |
| Certain-Teed Products Corp. 5½s '53 | ... | ... | ... |
| Champion Paper & Fibre Co. 3s '65 | ... | ... | ... |
| International Paper Co. 6s '55 | 107¼ | 107¼ | 107¼ |
| International Paper Co. 5s '47 | 103½ | 103½ | 103½ |
| Mead Corp. 3½s '53 | ... | ... | ... |

## New York Curb Exchange

High, Low and Last for Week Ending December 29, 1945

STOCKS

| | High | Low | Last |
|---|---|---|---|
| Great Northern Paper Co. | 43 | 42⅛ | 42½ |
| Hummel-Ross Fibre Corp. | 13⅛ | 12⅝ | 13⅛ |
| St. Regis Paper Co. | 11 | 10½ | 10⅝ |
| St. Regis Paper Co., pf. | ... | ... | ... |
| Taggart Corp. | 10 | 10 | 10 |

BONDS

| | | | |
|---|---|---|---|
| American Writing Paper Co. 6s '61 | 102½ | 100¾ | 100¾ |

## Ashland Mills Signs New Contract

ASHLAND, N. H., December 17, 1945—A second contract between the Ashland Paper Mills, Inc. and the United Mine Workers, District 50, has been accepted by the union and signed. Cecil V. Crawford, subregional director, announces. The contract, Crawford said, includes a five-cent-an-hour general wage increase, double time on Sunday, time and a half for nine holidays, Christmas bonus, group insurance provisions and vacation with pay.

## Boston Merchants Move

BOSTON, Mass., December 31, 1945—The office of the New England Paper Merchants Association has been removed from 89 Broad street to the Rice Building, 10 High street, Room 328. The telephone number remains the same, LIBerty 5256.

## Paper Stocks Show Strength

[FROM OUR REGULAR CORRESPONDENT]

MONTREAL, Que., January 2, 1946—Securities of pulp and paper companies have been prominent features of strength and activity not only during the past few months, but during a great deal of the past year's trading. The Montreal Stock Exchange's average of ten paper stocks has climbed to the highest level since 1937, reaching 305.49 at the close of the year, which represents an advance of 115.01 points over the figure at the close of 1944. The average, which only in 1943 was under the 100 level, is now some 70 points under the peak established in 1937 at 374.69, a level which looked unapproachable even a year ago.

The strength of the paper group found reflection in practically all individual issues, and many of the advances this year have been very substantial. Special considerations have sometimes held prices in check, as for instance where callable preferred stocks have tended to stay near their call prices. The following table compares current approximate prices of individual stocks with those at the end of 1944, and indicates the net changes for the period:

| Stock | 1944 Close | Approx. Current Price | Net Gain |
|---|---|---|---|
| Abitibi | 2⅞ | 6¼ | 3⅜ |
| Do. 6% Pfd. | 49 | 90½ | 41½ |
| Do. 7% Pfd. | 143 | 175 | 32 |
| Bathurst "A" | 14¾ | 20 | 5¼ |
| Bathurst B | 3½ | 7 | 3½ |
| B. C. Pulp | 35 | 63 | 28 |
| Do. Pfd. | 127 | 185 | 58 |
| Brown Co. | 2.30 | 6¾ | 3⅜ |
| Do. Pfd. | 45 | 77¾ | 32¾ |
| Consol. Paper | 9 | 16¼ | 7¼ |
| Donnacona | 11¾ | 17½ | 5¾ |
| Dryden | 8½ | 15 | 6½ |
| Fraser | 36 | 54 | 18 |
| Howard Smith | 22½ | 29⅜ | 7⅛ |
| Do. Pfd. | 110½ | 111½ | 1 |
| Int. Paper | 23½ | 49⅛ | 25⅝ |
| Do. Pfd. | 101 | 124½ | 23½ |
| Maclaren P. & P. | 23⅜ | 33½ | 10⅛ |
| M. & O. Paper | 12¾ | 17⅛ | 4⅜ |
| Price Bros. | 35½ | 56 | 20½ |
| Do. Pfd. | 101 | 101 | unch. |
| Quebec Pulp Pfd. | 40 | 39 | 1(d) |
| Rolland Paper | 11½ | 15½ | 4 |
| St. Law. Corp. | 2⅜ | 10 | 7⅛ |
| Do. Pfd. | 18½ | 36½ | 18 |
| St. Law. Paper Pfd. | 58¼ | 91 | 32¾ |

(d)—Net decline.

## West Virginia Nets $1.63

The West Virginia Pulp and Paper Company and subsidiaries for the year ended October 31, reports a net income, $2,142,072, equal, after preferred dividends, to $1.63 a common share. In addition, company credited $3,532,788 directly to surplus as "non-operating and non-recurring" addition resulting from sale of mature timber from company lands. Amount was segregated and will be added to funds for plant rehabilitation, improvements and expansion.

## Highland Mill to Produce in April

JAMESTOWN, N. C., December 17, 1945—W. G. Ragsdale, Jr., president of the Highland Container Company, states that production at the local plant is expected to get underway in March or April of next year. "Now under construction, the plant is expected to be larger than original plans called for," Mr. Ragsdale said. He added that present plans call for a floor area of approximately 100,000 square feet, with the building estimated to cost $350,000, and the machinery and equipment, $250,000.

Approximately 75 persons will be employed by the new plant which will manufacture corrugated board from which shipping containers of all sizes will be made.

# ANOTHER NEW YEAR...

Another New Year—the 88th since Hamilton Felts first entered the paper manufacturing industry! Oceans of water have passed through Hamilton Felts in those years. Mountains of paper and board have been formed on them. Millions of dollars have been saved by them. Generations of paper manufacturers have profited with them.

In the years to come as in the decades past you will have the assurance that, whether it be for the thinnest tissue or for the heaviest board, there will be a Hamilton Felt that will do your work better, faster and at lower cost.

**SHULER & BENNINGHOFEN, HAMILTON, OHIO**

• Miami Woolen Mills •

**Hamilton Felts**

• Established 1858 •

# Obituary

### Daniel Romund Moltzau

Dr. Daniel R. Moltzau, a staff member of The Institute of Paper Chemistry since 1935, died on December 27. A native of Wisconsin, he lived a number of years in Montana where in 1931 he received his B.A. from the University of Montana. He continued his chemical studies at the University of Minnesota where in 1935 he received his Ph.D. in physical and analytical chemistry. His thesis was a study of the physical chemistry of the formation of metallic sulfide precipitates. Subsequent to his graduate work, Dr. Moltzau joined the staff of the Institute and has served with distinction in teaching and thesis work with graduate students in the field of physical, analytical chemistry, and paper technology.

During his years at the Institute, Dr. Moltzau was also engaged in numerous researches on chemical problems dealing with paper manufacture, the outcome of a number of such investigations having found their way into useful applications in the industry and into the chemical literature. Over the past few years Dr. Moltzau's health had progressively failed due to causes which proved impossible of treatment, and it was during this period, particularly, when in great discomfort and anxiety, Dr. Moltzau was an inspiration to the staff for his unfaltering interest in chemistry and for his good cheer. Dr. Moltzau won the highest admiration of his associates and gave dignity to the profession.

### John K. Quinn

John K. Quinn died suddenly on December 25th. He was fifty years of age and had been an associate and sales representative of Paper Merchants, Inc., Philadelphia, for many years, serving principally upstate territory. He came with Paper Merchants, Inc., then Riegel & Company, Inc., before World War I. He left to enlist in the Navy and served for the duration of that war. He returned in 1920 and has been with the firm continuously since. He is survived by his widow, Rosella.

### Grant H. Fairbanks

Grant H. Fairbanks of 28 Summer street, Haverhill, Mass., a director of the Robert Gair Company, Inc., paper board manufacturers, of 155 East Forty-fourth street, New York, died December 27 in his room at the Hotel Commodore. His age was 68. He was born in Joplin, Mo., and was graduated in 1897 from Princeton University.

### Mae R. Bloch

The many friends of Alfred Bloch, of the well known firm of Alfred Bloch & Co., 358 Fifth Ave., New York 1, N. Y., dealers in paperstock, etc., will be sorry to learn of the death of his wife, Mrs. Mae R. Bloch, on Christmas morning, after a prolonged illness. Survivors, in addition to Mr. Bloch, are two sons, M/Sgt. Raymond I. Beck, and S/Sgt. Marvin Beck, and a daughter, Mrs. Doris Abramson.

### John Lindroth

John Lindroth, vice-president of Perkins-Goodwin Co., died on December 26 at the New York Hospital after a two-weeks illness. He was fifty-one. His entire business life was spent in the pulp industry. He came to this country from Sweden in 1924 to become associated with the Scandinavian Pulp Agency. In 1929 Perkins-Goodwin Co. absorbed the Scandinavian Pulp Agency and since that time Mr. Lindroth has been with Perkins-Goodwin Co. in various capacities. He became vice-president early this year. He was active in many branches of the industry and was widely know both here and in Sweden. Just prior to his death he was elected vice-president of the Association of American Wood Pulp Importers.

He is survived by his widow, Gladys Lindroth, and three brothers and a sister resident in Sweden.

### Simon Walter

Simon Walter, head of the paper firm of S. Walter, Inc., and a former member of the City Council, died December 27 in his home after a brief illness. His age was 76.

Born in Philadelphia, he was a school director in the old city school system before his election to the Common Council. He also was one of the original members of the single-chamber City Council that took office in 1920, serving until 1937. He was in the paper business for forty years and was a past president of the Philadelphia Paper Trade Association. He also was a member of the Philmont Country Club and the Locust Club.

He leaves a sister, Mrs. Isaac Pike.

### Charles C. Irvine

Charles C. Irvine, vice president and manager of the Manitoba Paper Company, at Pine Falls, Man., for the past 20 years, died in hospital at Winnipeg, Man., on Christmas eve. Mr. Irvine was taken ill while returning from a business trip to Toronto. The late Mr. Irvine was 65 years of age. Burial took place at Pine Falls.

## Whiting Installs Retirement Plan

HARVEY, Ill., December 27, 1945—Certificates of Participation have just been issued to all employees of the Whiting Corporation qualified to share in the company's new retirement plan. The purpose is to provide additional income at the normal retirement age of 65, over and above the regular social security benefits shared alike by all workers. To qualify, an employee must be between the ages of 30 and 65, with basic pay in excess of $3,000 per year and in continuous employ of the company for 5 years or more.

For most employees the retirement fund is in the form of an insurance policy with definite cash value in event of death and with a specified income at age 65 as determined by length of service, average earnings, and other factors described in the printed regulations issued to each participant. For those above age 55 and those who are disqualified for life insurance, the benefit is in the form of an annuity policy.

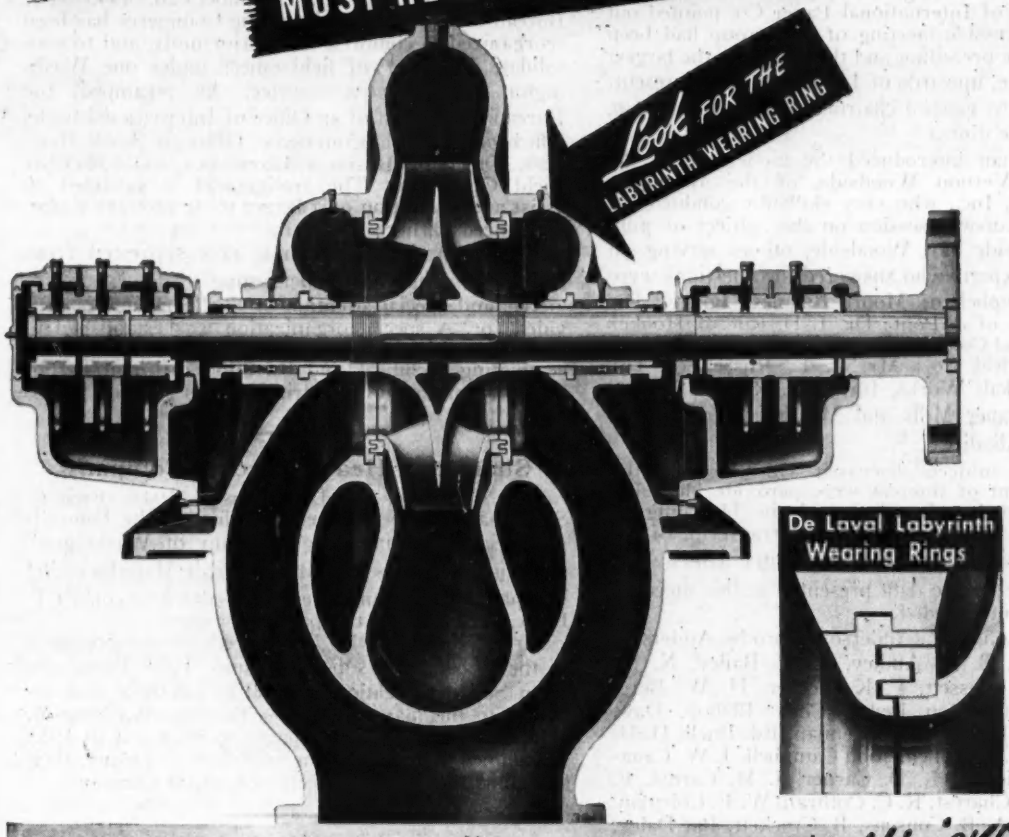
Under the plan as now set up the company pays all premiums, with no contribution from the employee. Continuance of the plan depends, of course, upon future earnings and is subject to revision by the Board of Directors in case conditions require changes.

## Shatzkin Opens Own Office

Isaac Shatzkin as of January 1st, opened his own office. He will operate his own business which will be known as Lakeland Paper Company, Incorporated. His headquarters are at 41 Park Row, New York.

THE PUMP YOU BUY *TODAY*

MUST HELP MEET COMPETITION *TOMORROW*




# DE LAVAL LABYRINTH RINGS *keep efficiency UP cost DOWN*

**De Laval Labyrinth Wearing Rings minimize leakage from discharge back to suction. The sealing action of these rings is accomplished by the use of large clearance, tortuous labyrinth passages and does not depend upon close mechanical clearances, such as required for plain flat rings. Because of the larger clearances and reduced flow, the effectiveness of the De Laval labyrinth ring is but little diminished by wear, resulting in sustained efficiency for long periods. When selecting pumps for lowest ultimate cost, look for the De Laval Labyrinth Wearing Ring.**

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TURBINES • HELICAL GEARS
WORM GEAR SPEED REDUCERS
CENTRIFUGAL PUMPS • CENTRIFUGAL BLOWERS and COMPRESSORS • IMO OIL PUMPS

**DE LAVAL**

STEAM TURBINE COMPANY · TRENTON 2, NEW JERSEY

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## Niagara Falls TAPPI Holds Pulp Bleaching Forum

The Niagara Falls Group of the Empire State Section of the Technical Association of the Pulp and Paper Industry, held a joint meeting with the Canadian Section, on Wednesday, December 12 at the Prospect House in Niagara Falls, New York. Dr. A. H. Nadelman of International Paper Co. pointed out that each successive meeting of this group had been larger than the preceding and that this was the largest meeting to date, upwards of 140 people being present. B. J. Staneslow, general chairman of the local group, presided at the dinner.

Dr. Nadelman interoduced the moderator of the forum, Mr. Vernon Woodside, of the Mathieson Alkali Works, Inc., who very skillfully conducted a question and answer session on the subject of pulp bleaching. Beside Mr. Woodside, others serving on the panel of experts who answered the questions were Dr. John Campbell of Moore Business Forms; Dr. J. S. Reichert of duPont; Dr. J. D. Rue of Hooker Electrochemical Co.; Dr. H. O. Kauffmann of Buffalo Electro Chemical Co.; Mr. L. E. Russell of The Mathieson Alkali Works, Inc.; Mr. Russell Shearer of Alliance Paper Mills and Mr. Ferri Casciani of the Niagara Alkali Co.

Among the subjects discussed which aroused the greatest amount of interest were peroxide bleaching of ground wood and sodium chlorite bleaching of chemical pulp. It is expected that a transcript of the proceedings will be published at a later date so that all may benefit by the data presented at this meeting.

Those present included:

S. I. Anderson, L. C. Anderson, Dorothy Anderson, D. P. Arnold, B. A. Audley, H. P. Bailey, N. M. Barber, F. A. Bassett, F. K. Becker, H. W. Berg, J. L. Bergman, Don Berry, Chas. Bishop, Dave Blakley, J. A. Boyer, J. E. Brennan, Ed. Buell, D. H. Cameron, D. J. Campbell, John Campbell, J. W. Canavan, R. Carmichael, L. D. Carner, J. M. Carnia, F. Casiani, P. T. Charest, R. C. Cothran, W. F. Coleman, F. B. Collins, A. B. Cousens, B. Crockett, Pat Daley, H. R. Davidson, W. V. Day, F. W. Decker, W. R. Diver, P. F. J. Dolan, R. M. Drummond, Jean (Mrs.) Drury, V. Eager, H. E. Eamer, Ralph Eiff, Merril Eldridge, B. W. Ellis, R. B. Embury, L. T. Farrel, S. A. Finlay, H. F. Freas, M. F. Gannon, C. C. Gerry, J. Gillis, A. B. Gorham, E. D. Graves, P. N. Halliwell, A. P. Hardlben, B. S. H. Hatfield, A. C. Hays, L. W. Hebert, A. P. Heilborn, G. S. Henderson, C. K. Hendsbee, R. Hitchcock, L. F. Hock, S. S. Hoffman, R. J. Hopkins, J. T. Jaeger, E. J. Johnstone, N. C. Jones, P. B. K'Burg, H. E. Karberg, H. O. Kauffman, D. B. Keefe, C. J. Kellogg, J. F. Klausman, D. R. Kraft, R. S. Kurtz, E. J. Lawlor, R. J. Lee, H. R. Lensen, F. B. Loppnow, H. G. Loyer, Archie Maloney, Rose Martinez, C. S. McBride, McCombes, R. McCully, C. H. Meyers, R. H. Morgan, L. Morin, John Morrison, June Mosher, C. E. Mueller, S. O. Murray, Murphy, A. H. Nadelman, Edith Nichols, G. E. Norton, W. M. Orchard, A. Pamplin, L. Paquette, Harold Peterson, G. A. Petroe, Josephine Pietrowski, R. H. Pitts, L. M. Randle, C. H. Rasch, Geo. Rasch, T. J. Redding, T. P. Redding, J. S. Reichert, P. R. Rolleston, J. D. Rue, R. D. Rusch, L. E. Russell, F. Rydelek, S. M. Scaletta, Gertrude Schmidt, R. C. Schuler, E. S. Shanley, Wm. Shrubsall, E. D. Smith, D. Smith, E. C. Soule, B. J. Staneslow, S. Stapley, W. O. Stauffer, G. K. Storin, G. E. Taylor, L. J. Thurman, C. A. Tryan, T. M. Uptegraff, C. H. Vickery, W. K. Voss, A. M. Walker, Lloyd Wallace, E. R. Wand, C. O. Webber, H. P. Wells, S D. Wells, J. C. Wilson, V. Woodside, Marylyn Young and J. Youngchild.

## Commerce Bureau Is Revamped

WASHINGTON, D. C., December 28, 1945—The Bureau of Foreign and Domestic Commerce has been reorganized to comprise five major units, and to consolidate a number of field offices under one Washington administrative service. As revamped, the Bureau will consist of an Office of International trade, Office of Domestic Commerce, Office of Small Business, Office of Business Economics and Office of Field Operations. The realignment is intended to assist administration of a larger trade promotion plan announced earlier.

Foreign trade promotion is now separated from activities in the Bureau pertaining to domestic commerce, and special attention to small business is provided for. A special organization was established to cooperate with military agencies in collecting and disseminating technical and scientific information obtained from enemy industrial sources abroad.

## Shaneman Heads Tacoma Company

PHILADELPHIA, Pa., December 24, 1945—Fred C. Shaneman has been named president of the Pennsylvania Salt Manufacturing Company of Washington, a subsidiary of the Pennsylvania Salt Manufacturing Company, it was announced here today by Leonard T. Beale, president of the parent company.

Mr. Shaneman, who has served as vice-president of the Washington subsidiary since 1939, joined the Penn Salt organization in 1930 as salesman and assistant to the manager of the Tacoma, Washington, plant. He became sales manager in 1931 and in 1933 was named Manager of the subsidiary company, then known as the Tacoma Electro-Chemical Company.

## Mike Gilbert Back on Old Route

Mike Gilbert, familiar Reinhold-Gould salesman is back on his old beat and "already going strong," according to the latest announcement by Harry E. Gould, President, Reinhold-Gould, Inc., paper merchants at 535 Fifth Avenue, New York. Mike saw active front line duty in France and Germany from "D-day on," and campaigned through most of the important engagements leading up to Nazi capitulation. His early paper warehousing experience proved a valuable contribution to the supply services, and successful operations of "getting materials through" drew special commendations and unit citations.

## McNair Sells St. Regis Pulp in Midwest

William M. McNair has been named midwestern sales representative of the Pulp Department of St. Regis Paper Company. He has represented the pulp division of Weyerhaeuser Timber Company in the mid-west since 1935, except for three years during which he served as an intelligence officer in the Army Air Forces. Mr. McNair will cover from offices in Chicago the territory embracing the states of Illinois, Indiana, Iowa, Kentucky, Michigan, Minnesota, Missouri, Ohio, Tennessee, West Virginia and Wisconsin.

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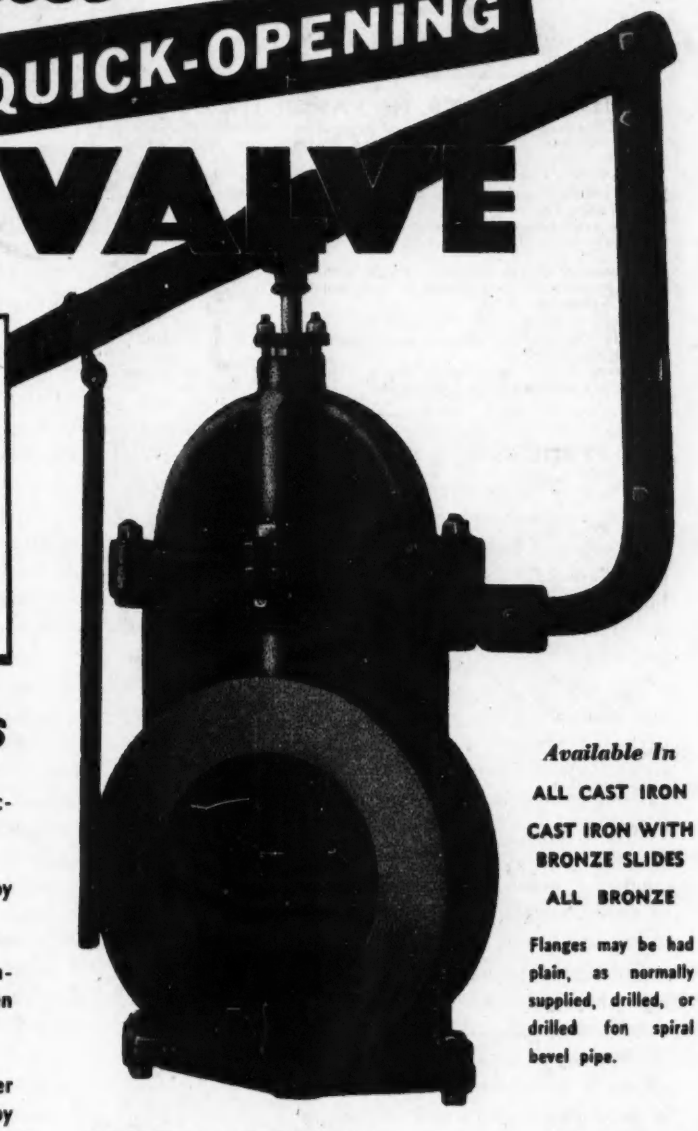

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2) Slide can be held in any required position by the clamp.

3) Slide can easily be removed from valve without taking valve from the pipe — simply loosen bolts holding bonnet to body.

4) If valve becomes clogged, preventing proper closing of slide, valve can readily be cleaned by loosening bolt on bottom plate and turning it to one side.

5) Stem end is cut standard pipe thread, permitting extension by connecting a piece of pipe. No threads on working part of stem to wear out. No nuts or hand wheels to be broken or lost. Gate cannot get loose from stem.

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**ALL BRONZE**

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. . . on all stock pipes leading to screens . . . on wet machines . . . where rewater is used over again to thin the pulp coming from grinders . . . in connection with beaters, when slush pulp is used . . . on all pipe lines furnishing slush pulp . . . in any place where low pressure valves can be used.

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PAPER
TRADE JOURNAL
Reg. U. S. Pat. Off.
W. L. Cook, Editor

## COMING EVENTS IN PAPER INDUSTRY

New England Section. Technical Association of the Pulp and Paper Industry—Third Friday of each month at the Roger Smith Hotel, Holyoke, Mass.

Delaware Valley Section. Technical Association of the Pulp and Paper Industry—First Friday of each month at the Engineers Club, Philadelphia, Pa.

Lake States Section. Technical Association of the Pulp and Paper Industry—Second Tuesday of each month at the Conway Hotel, Appleton, Wis.

Kalamazoo Valley Section. Technical Association of the Pulp and Paper Industry—First Thursday of each month at the Park, American Hotel, Kalamazoo, Mich.

Empire State Section. Technical Association of the Pulp and Paper Industry—Second Thursday of each month at the Woodruff Hotel, Watertown, N. Y.

Chicago Professional Paper Group. Third Monday of each month except July and August at Chicago Bar Association, Chicago, Ill.

## INDUSTRY'S OUTLOOK GOOD

The outlook for the paper industry is good. From current estimates it appears that paper manufacturers will require a larger supply of pulpwood, wood pulp, paper stock, rags and chemicals to operate at the highest practicable production ratio in 1946 than consumed in 1945, when the average production ratio was about 90% of capacity. The very heavy demands of the war greatly accelerated technological advances and manufacturing methods. As raw paper and paperboard has been found of great utility and readily fabricated into more paper products than existed in pre-war years, a larger tonnage is expected to be required to meet the demand this year. Wood pulp as a raw material for the production of non-paper goods, as rayon, etc., may be expected to continue in heavy demand throughout this year. A strong demand for heavy chemicals must necessarily follow.

Prospects for raw papermaking materials is favorable. The current tight market supply situation in certain chemicals, as chlorine, caustic soda, alumina sulphate, and soda ash is expected to be overcome within a few months. The principal cause of low inventories in pulpwood, wood pulp, waste paper, rags and in some important chemicals, is lack of labor and some loss of production has occurred in the chemical industry through strikes. The general unsettled labor situation is, of course, the chief deterrent factor in all industries. The cost of labor is becoming more important an element in total costs as demands for substantial increase in wage rates and take home pay continue to spread through the major industries.

The price structure is another vital problem which appears to be only partially solvable under the present OPA pricing formula. Despite the vigorous efforts of this agency to keep prices from rising, it is difficult to foresee any other effect than increased wages forcing prices up. If wages were controlled, as in Canada and in England, the OPA might meet with a measure of success. The great "bulge" of wage increases seems to cast considerable doubt that the OPA can attain its objectives under the partial control of the economy the agency is now authorized to act. High production of goods for domestic consumption, and not merely high output for world-wide distribution, seems clearly needed to absorb the excess purchasing power which creates the bogey of inflation which so many of our economists fear. The doubtful expediency of trying to "hold the line" of prices with a weak line-up, is more apparent every day. The most discouraging evidence in the continuance of arbitrary price fixing, is in the many reports that inequitable prices are checking production of badly needed goods for home consumption.

Supplies of fibrous papermaking materials in October indicated a favorable over-all situation, although in close balance, with a relative small margin in supply above the increasing trend in consumption. Receipts of pulpwood were 92,478 cords below September; consumption was 62,943 cords higher and total inventories rose 86,889 cords. Waste paper receipts at the mills in October rose 76,037 tons; consumption increased 56,778 tons; and inventories increased 11,813 tons above September.

The latest reports on straw show that October receipts were 32,106 tons less than in September; consumption declined 1,928 tons and inventories increased 18,245 tons. Supplies of rags increased 5,755 tons in October above September; consumption increased 4,019 tons, and inventories decreased 1,469 tons. Flax supplies increased 1,633 tons in October above September; consumption increased 690 tons, and inventories increased 3,935 tons. Consumption of staple and linters cotton in October was 3,439 tons, compared with mill receipts of 4,088 tons. Receipts of Manila fiber in October totaled 579 tons, compared with 574 tons in September; consumption increased 342 tons and inventories increased 104 tons.

Wood pulp supply, according to the latest data continues with consumption in close balance with production and with inventories at a relative low level. With current demand requiring all the pulp available, a very close balance in pulp is expected to continue through the first quarter of this year. This is indicated in the latest data of the Bureau of the Census. Total consumption of wood pulp, all grades, in October was 747,741 tons; inventories 290,130 tons. Consumption of sulphite aggregated 253,415 tons, compared with inventories of 214,541 tons. Consumption of sulphate totaled 434,008 tons, compared with inventories of 128,237 tons, of which the consumption of unbleached sulphate was 346,936 tons, and inventories 87,179 tons. Consumption of soda pulp in October was 42,969 tons, with inventories at 12,083 tons. Total consumption of groundwood in October was 171,683 tons, with inventories reported at 27,832 tons.

## Venezuela Takes More Cigarette Paper

WASHINGTON, D. C., December 28, 1945—Since there is no manufacture of cigarette paper in Venezuela, domestic cigarette makers are entirely dependent on imports, says a report received at the Department of Commerce. Prior to the revolution in Spain most of the cigarette paper was imported from that country, but Czechoslovakia, Finland and the United States became the principal suppliers. For the past four years the United States has been the sole source of Venezuela's cigarette paper. United States paper is very popular with the manufacturers and it is likely that we can continue to supply the bulk of the paper needed if prices can be kept at the competitive level.

The only cigarette paper consumed in Venezuela is in spools or bobbins with a standard length of 4000 meters (about 1,220 feet) and a width of 32 millimeters (slightly over 1¼ inches). Importation and distribution of cigarette paper is a monopoly of the Venezuelan government with internal revenue on locally produced cigarettes collected through sales of cigarette paper to manufacturers. The 1944 consumption of cigarette paper is estimated at 36,000 of the 4,000-meter bobbins, and consumption for the first six months of 1945 is estimated at 20,300 bobbins. Estimates indicate that Venezuelan consumption has been increasing since 1942.

## Albany, Ga., to Study Paper Mill

ALBANY, Ga., December 17, 1945—Plans have been made by the local Chamber of Commerce whereby a committee from that organization will visit Charleston, S. C., Savannah, and other cities where paper pulp mills are operating to study that industry in view of the fact that such an industry has been proposed for Albany. During the past several months, a paper mill has become interested in locating a $10,000,000 plant in the Albany section.

## Production Ratio Report*

(Production as per cent of six-day capacity)

COMPARATIVE WEEKLY SUMMARIES

| Current Weeks—1945 | | Corresponding Weeks—1944 | |
|---|---|---|---|
| Nov. 17 | 96.4 | Nov. 18 | 90.3 |
| Nov. 24 | 91.4 | Nov. 25 | 87.2 |
| Dec. 1 | 97.5 | Dec. 2 | 91.0 |
| Dec. 8 | 99.0 | Dec. 9 | 93.7 |
| Dec. 15 | 99 0 | Dec. 16 | 89.3 |
| Dec. 22 | 93.8 | Dec. 23 | 84.6 |

COMPARATIVE MONTHLY SUMMARIES

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1944 | 88.7 | 88.5 | 88.1 | 87.6 | 88.7 | 89.8 | 80.3 | 90.6 | 88.2 | 92.5 | 90.6 | 92.4 | 88.1 |
| 1945 | 86.7 | 89.4 | 90.2 | 88.1 | 89.8 | 91.2 | 80.8 | 88.6 | 90.2 | 95.9 | 95.5 | | |

COMPARATIVE YEARLY SUMMARIES

| | 1938 | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 | 1945 |
|---|---|---|---|---|---|---|---|---|
| Year to Date | 71.7 | 83.4 | 86.0 | 97.6 | 91.3 | 88.5 | 88.7 | 89.9 |
| Year Average | 71.5 | 83.4 | 85.6 | 97.4 | 90.4 | 87.8 | 88.1 | |

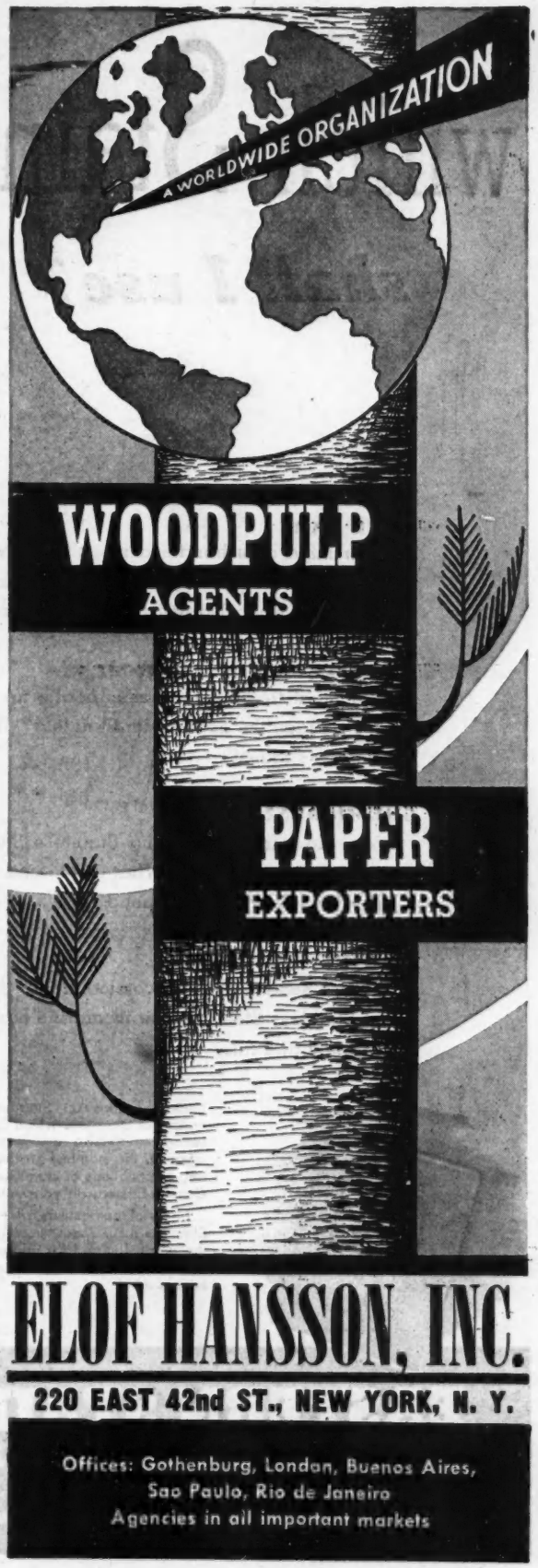
* Based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

PAPERBOARD OPERATING RATIOS†

| Current Weeks—1945 | | Corresponding Weeks—1944 | |
|---|---|---|---|
| Nov. 17 | 95 | Nov. 18 | 96 |
| Nov. 24 | 91 | Nov. 25 | 91 |
| Dec. 1 | 96 | Dec. 2 | 94 |
| Dec. 8 | 97 | Dec. 9 | 95 |
| Dec. 15 | 98 | Dec. 16 | 94 |
| Dec. 22 | 92 | Dec. 23 | 91 |

| Year | Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. | Year Avg. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1944 | 90 | 96 | 95 | 96 | 96 | 96 | 85 | 96 | 92 | 95 | 95 | 85 | 93 |
| 1945 | 91 | 95 | 97 | 97 | 96 | 96 | 86 | 90 | 91 | 97 | 95 | | |

† Per cents of operation based on "Inch-Hours" reported to the National Paperboard Assn.



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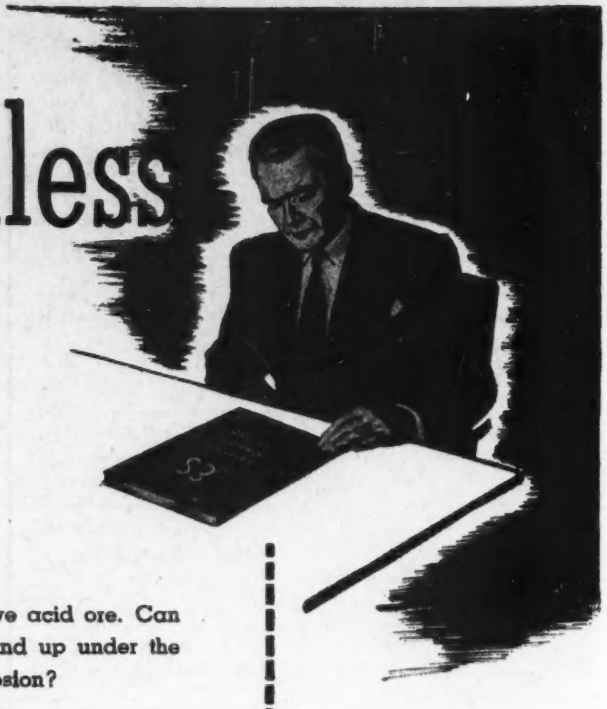

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Our mine cars handle a moist abrasive acid ore. Can we get a Stainless Steel that will stand up under the abrasion, and also resist the acid corrosion?

**HEAT TREATING EQUIPMENT?**
Our heat treating furnaces operate up to 1,500° F. Can we replace the hoods with Stainless? If so, which grade do you suggest?

**CHEMICALS?**
We are thinking of using Stainless Steel sheets for the lining of our dye vats. What grade and finish of Stainless Steel would you recommend?

**MARINE HARDWARE?**
Please send us your recommendation for the best grade of Stainless Steel for use in marine hardware, including rudders and fins.

Such questions on Stainless Steel selection are typical of questions which Eastern Stainless representatives answer every day. Eastern Stainless offers *all* the stainless grades you need for specialized applications of stainless steel sheet and plate. Consult Eastern on your selection problem.

Many of the answers are in the 96-page "Eastern Stainless Steel Sheet" handbook which, because of the great demand for copies, is now in its second printing. Write for your copy on your company letterhead.

(ESS. 5-41)

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Section of the
TECHNICAL ASSOCIATION
OF THE PULP & PAPER INDUSTRY
122 E. 42nd St., New York 17, N. Y.
Edited by R. G. Macdonald, Secretary

# Instrumentation Studies LII*

## Penetration of Papers by Water Vapor. VI.

### Progress Report on the Development of Two New Electric Methods for the Measurement of Water Vapor Permeability

By the Staff of The Institute of Paper Chemistry

**Abstract**

*This report describes the development of two non-gravimetric methods which have evolved from a method suggested in a previous report of this series (1). These two methods are designated, respectively, as the "steady-state" and "dynamic" methods. In the steady-state method, the test specimen is sealed between a space of constant, high relative humidity, and a narrow space of variable relative humidity. The latter space communicates with a large space (or room) of constant and known relative humidity through a variable, standard diffusion resistance. This resistance is varied to obtain a standard relative humidity in the narrow space between the specimen and the diffusion resistance. The relative humidity in the narrow space is indicated by a very small electric hygrometer. Under steady-state conditions, the water vapor permeability is expressed in terms of the setting of the diffusion resistance. In the dynamic method, the apparatus is modified by setting the diffusion resistance at infinity, or by replacing the partition containing the diffusion resistance with a glass plate. In using this method, the time rate of increase of the relative humidity in the narrow space is measured with the small electric hygrometer located in that space. The water vapor permeability is obtained from the observed rate. Both theory and observations show that the rate depends upon the water-vapor absorption capacity of the portion of the specimen lying between the moistureproof barrier and the narrow space as well as upon the steady-state water-vapor permeability. However, for a given type and grade of moistureproof sheet there is a correlation between the observed rate and the permeability as determined by the gravimetric method. This method results in the greatest speed of testing thus far achieved, and is believed to be useful for mill control testing, in spite of the dependence of the result on moisture absorption characteristics of the specimen.*

The last section of Part I of the current series of reports on water vapor permeability *(1)* presented a suggestion for an electric, nongravimetric method for evaluating the permeability of moistureproof sheets. Since the issuance of Part I, a considerable amount of research and development work has been done with various designs of equipment embodying ideas stemming from the suggestion that permeability to moisture might be more effectively measured by a comparison method involving a standard of diffusion resistance and evaluation of relative humidity by means of a small hygrometer. Two principal methods have thus far been evolved. These have been named, respectively, the "steady-state" and "dynamic" methods. It is the purpose of this progress report to present the results of studies made with these new methods.

### Principles of the New Methods

The *steady-state method* is essentially that already described in Part I *(1)*. The principles may be set forth with the help of the schematic drawing given in Fig. 1. The opening of a shallow vessel (V) is covered with the test specimen (S), to which the vessel is sealed in the usual manner with a ring of wax. A plate containing a variable (but standard and reproducible) diffusion resistance (R) is placed upon and sealed to the wax ring. (The representation of R in Fig. 1 is a symbol for a variable diffusion resistance, and is not intended to be a sketch of any actual resistance.) A small hygrometer (H), preferably of the type developed by Dunmore *(1)*, is mounted on the lower face of this top plate. The relative humidity below the specimen is maintained at a constant value ($r_1$) by a saturated salt solution at the bottom of the vessel. The relative humidity ($r_3$) outside the assembly is that maintained at a steady value in either a controlled cabinet or a constant temperature, constant humidity room. The value of the relative humidity ($r_2$) in the narrow space between the specimen and the diffusion resistance will vary from $r_3$ at the start of a test to a limiting or steady-state value which will obtain when the rate of passage of moisture through the specimen is exactly equal to the rate of passage through the resistance. The steady-state value will depend upon the relative permeabilities of the specimen and the diffusion resistance.

The variable resistance is adjusted so that the relative humidity ($r_2$) in the intermediate space approaches a predetermined steady-state value. When this value has been attained, and equilibrium established, the permeability of the specimen is obtained from the setting of the variable resistance.

The *dynamic method* employs a simple modifica-

* This report is one of a series issued as a part of the Instrumentation Program of the American Paper and Pulp Association.
The data in this report were presented to the American Paper and Pulp Association on February 1, 1944, as Report No. 30, Part V.

tion of the apparatus shown in Fig. 1. The resistance R is closed off, or a simple top plate having no openings is used. At zero time the top plate is placed upon and sealed to the wax ring, and the relative humidity ($r_2$) in the intermediate space is measured at intervals by means of the hygrometer (H). A plot of the relative humidity above the specimen against time is the familiar saturation type, exhibiting greatest slope at early times, and an asymptotic approach to the limiting relative humidity ($r_1$). Having established the correlation between the slope at a standardized value of $r_2$ not far above $r_3$ and the true water vapor permeability for sheets of a *given type and grade*, the permeability may be obtained from the early rate of change of relative humidity and the calibration chart. This method is in principle the fastest of all possible methods.

The factors governing the initial rate of increase of the relative humidity in the narrow space above the specimen should be briefly discussed at this point. In a steady-state method the relative humidities on the two sides of the specimen are constant, and the variation of moisture content with distance through the specimen is constant; the rate of passage of moisture across any plane in the specimen is independent of the location of the plane. These conditions do not obtain in an unsteady state or dynamic method. For the purposes of illustration we may let the relative humidity below the specimen ($r_1$) be high, and that initially above the specimen ($r_3$) be low. Although there are a variety of possible initial distributions of moisture throughout the specimen, depending upon the past history of the specimen, let us assume that, at zero time, the specimen was in equilibrium with the atmosphere of relative humidity $r_3$. Immediately after sealing the specimen in place, much if not most of the moisture passing up through the lower face of the specimen becomes sorbed in the specimen to raise the latter's moisture content, and the remainder passes into the narrow space where a small part is sorbed on the surfaces bounding that space and the rest remains in the space to increase $r_2$. At all times during the test the distribution of moisture content through the specimen is changing, and hence the rate of rise of relative humidity in the upper space is not as great as the rate calculated for a sheet of no mass. For a given relative humidity difference the rate will be seen to depend upon the mass of absorptive sheet material above the barrier (or barriers), the moisture content-relative humidity relationship for each ply of the material, the disposition in the specimen of the barriers when there are two or more barriers and, of course, the permeability of the specimen. In addition, the mass and absorptive characteristics of the surfaces bounding the narrow space above the specimen (including the hygrometer) and the vertical thickness of the space influence the observed rate.

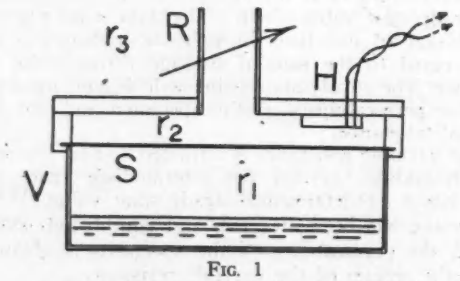


Fig. 1
Schematic Diagram of Steady-State Electric Method

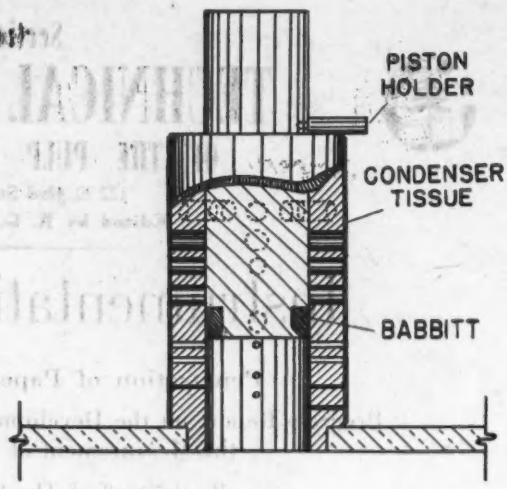


Fig. 2
Variable Diffusion Resistance

For a given permeability of the specimen and relative humidity difference, the observed rate of increase of the relative humidity $r_2$ will be relatively large when (1) the specimen has a single barrier, disposed on the upper face, (2) the absorption capacity of the barrier is small, (3) the absorption capacity of the hygrometer is small, (4) the bounding surface of the upper space is small and has low affinity for moisture, and (5) the thickness of the upper space is small. The rate of increase will be relatively small when the specimen consists of a heavy sheet of hygroscopic material with a barrier disposed on the lower face, and the factors (3), (4), and (5) above are large.

The influence on the rate of increase of the relative humidity $r_2$ of the absorption capacity of that part of a specimen lying above a single barrier, and of other variables, may be estimated from the theory presented in the appendix. It may be shown that an unfavorable disposition of the barrier in a specimen may result in a rate which is a small fraction of that which would be observed if none of the transpiring moisture were absorbed by either the specimen or surfaces in contact with the upper space.

In view of the dependence of observations with the dynamic method on sheet properties other than the water vapor permeability, this method requires calibration for the given type and grade of moisture-proof material to be tested. The method is intrinsically fast and is most effective when the specimen has a single barrier and is inserted in the apparatus so that the barrier is on top. The steady-state method is intrinsically slower than the dynamic method (although significantly faster than the gravimetric method). The permeability observed with the steady-state method is a function of the sheet permeability alone; according to theory a single calibration of the instrument would be applicable for specimens of all types.

### Apparatus

The originally suggested steady-state method *(1)* was illustrated with apparatus in which small fans driven by a rotating magnetic field served to stir the air in such compartments separated by the specimen. Such equipment was actually constructed, and small

magnetized, two-bladed propellers were successfully spun by means of six simple electromagnets arranged below the apparatus and connected to three-phase lines. This somewhat complex arrangement, however, served a useful function only for poor specimens, because the air resistance of still air in the compartments is significant only when the specimen under test is very permeable. In view of the fact that the resistance of still air is negligible in comparison with that of specimens of practical interest, it was decided to eliminate the complication of stirring equipment; any influence of the diffusion resistance of still air would, in any case, be properly taken into account through calibration of the apparatus.

Another feature of the originally suggested method was a fixed, standard diffusion resistance. The relative humidity $r_2$ would assume some value between $r_1$ and $r_3$, and calculation involving the three relative humidities and the standard diffusion resistance would yield the permeability of the specimen. It is generally considered desirable to obtain the permeability for fixed values of relative humidity at the two faces of the specimen and, hence, a variable diffusion resistance was adopted. An incidental advantage of this decision is the fact that the electric hygrometer need be calibrated at only a single relative humidity, which may be simply and effectively provided by a saturated solution of a suitable salt.

### The Variable Diffusion Resistance

The diffusion resistance is the series combination of the low resistance of the air in the upper space, and the resistance of the "resistor" itself. The hygrometer is located at a point intermediate the surface of the specimen and the lower end of the resistor, so that the humidity which it indicates is not quite the same as that at the upper surface of the specimen. However, the locations of the resistor and hygrometer and the dimensions of the upper space are made the same in all pieces of equipment of the same design, so that calibration properly accounts for these considerations. The outer ends of all resistors which have been constructed have been covered with a single layer of condenser tissue, which serves to prevent air currents outside the unit from setting up turbulence inside the resistor. The resistance of condenser tissue is reasonably constant, but variations would have inappreciable effect because the resistance of such tissue is negligible in comparison with the over-all resistance of the air space above the specimen, the resistor, and the tissue.

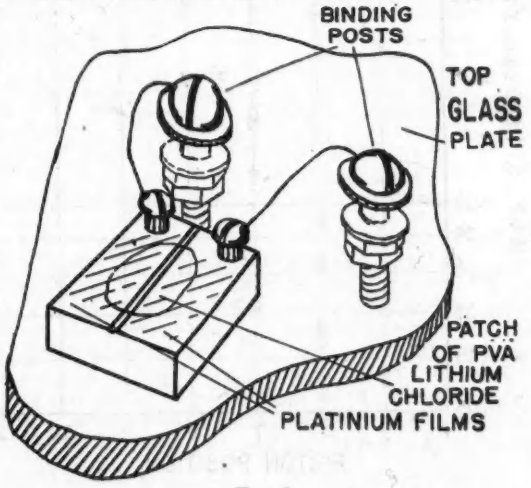


Fig. 3
**Electric Hygrometer Element (Inverted Position)**

The first variable resistor was a simple butterfly valve consisting of a vertical cylinder and a centrally located disk of thin metal soldered to a wire shaft passing horizontally through the axis of the cylinder. An indicating needle was connected to one end of the shaft, and the angular position of the valve was read from a quadrant cut from a small protractor. The top, or outer end, was covered with a single layer of condenser tissue. Satisfactory operation was obtained with specimens of mediocre or poor moisture proofness, but difficulty was experienced with specimens of good quality. This was due to the fact that a small, necessary clearance between the periphery of the disk and the inner surface of the cylinder (of the order of 0.002 inch) resulted in appreciable permeability when the disk was in the position for maximum resistance; because of the small thickness of the disk and the large circumference, the diffusion resistance was not as high as might be expected—the area of the gap between cylinder and disk was equivalent to that of a hole about 0.06 inch in diameter.

A design which served well for the fundamental investigation of the steady-state method but probably would require simplifying modifications before it might be considered sufficiently inexpensive for commercial instruments is shown in Fig. 2. A thick-walled cylinder of brass has several series of holes or capillaries drilled through the wall. A snug fitting piston selector may be moved up or down to vary, in steps, the number of capillaries through which moisture may diffuse. The diffusion resistance is lowered by raising the piston. In its lowest or zero position the permeability is negligible; in its first position a single hole of diameter 0.020 inch serves as the main portion of the resistance; in its second position, a further single hole is brought into play. The subsequent series are so chosen as to give increasing permeability in roughly geometric progression, the permeability of the capillaries for any one setting being about twice that for the preceding setting. The size and number of capillaries at each setting are given in Table I. The permeability corresponding to a piston setting is, of course, approximately equal to the sum of the permeabilities of all capillaries below the piston. The inside rims of the capillaries are beveled.

TABLE I.—DISTRIBUTION OF CAPILLARIES IN THE VARIABLE RESISTOR

| Position | Diameter, inch | No. of Capillaries |
|---|---|---|
| 1 | 0.020 | 1 |
| 2 | 0.020 | 1 |
| 3 | 0.020 | 2 |
| 4 | 0.040 | 1 |
| 5 | 0.040 | 2 |
| 6 | 0.040 | 4 |
| 7 | 0.113 | 1 |
| 8 | 0.113 | 2 |
| 9 | 0.113 | 4 |
| 10 | 0.159 | 4 |
| 11 | 0.159 | 10 |

A babbitt metal ring at the bottom end of the piston ensures a close fit, and turbulence in the capillaries is prevented by wrapping a single layer of condenser tissue around the outer surface of the cylinder.

No attempt was made to create a set of permeabilities of absolute values determined by construction, since it is believed that calibration against the gravimetric method, *utilizing the same specimens in the two methods,* is necessary and desirable. It was hoped, however, that several variable resistors made

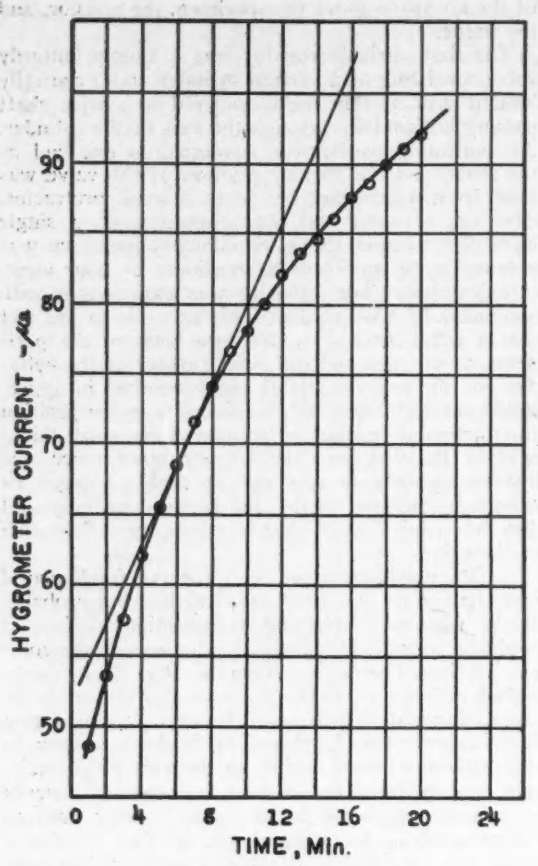


FIG. 4
Increase of Hygrometer Current with Time (Dynamic Method)

in accordance with the same design would have a common calibration.

Ordinarily, stepwise variation is not considered as desirable as continuous variability. However, in view of the great variability of water vapor permeability of moistureproof wrappings and the lack of close agreement between results obtained in different laboratories, it was considered that a stepwise variation of the standardized resistor would be acceptable to many persons working in the field. If one desires closer measurement than is permitted by taking the nearest setting of the piston, interpolation between bracketing settings is easily accomplished.

It should be emphasized that the design given in Fig. 2 was developed for research on the method itself, and is not believed to be as simple and inexpensive as would be desirable in the ultimate commercial instrumentation of the basic method. The final design should permit inexpensive construction so that an ordinary mill control laboratory might have a reasonably large number of instruments.

### THE ELECTRIC HYGROMETER

The electric element is a modification of the type developed by Dunmore *(2)*. A typical circuit, and other details are given in Fig. 1 of Instrumentation Studies XLV (*2a*). For the present work, an improvement in design made by Dunmore *(3)* has been used. Instead of winding the element with platinum or palladium wire, a flat strip of good insulating material is coated with two adjacent thin layers of a noble metal like gold or platinum as shown in Fig. 3; this presents a sketch of the unit mounted on the glass plate, in an inverted position. The coating may be done by evaporation or cathodic sputtering *(4)*. In the present work cathodic sputtering of platinum was employed. (The amount of platinum used is so slight —just enough to make an opaque film—that the cost is negligible, and several units may be sputtered at the same time.)

In the currently adopted design, a piece of polystyrene ⅛ inch thick is cut to a length of ½ inch and a width of ¼ inch. After sputtering, the element is placed in a shaper and a central groove is cut lengthwise of the element, forming two closely adjacent rectangles of platinum film, each ½ inch long by slightly less than ⅛ inch wide. The groove is cut to a depth on only about 0.0025 inch (just sufficient to remove the platinum film and a little polystyrene) and a width of about 0.023 inch. Any platinum on the outer edges of the piece is removed. The platinum films take the place of adjacent turns of wire in the earlier design. Connection to the films is made by two No. 0-80 brass screws, as shown in Fig. 3. Small brass collars, just sufficiently long to permit holding with tweezers, are placed between the heads of the screws and the platinum films. The fine connecting wires are soldered to the heads before introducing the screws, in view of the thermoplastic nature of the polystyrene. Cementing of the polystyrene block to the glass plate and sealing around the large binding posts employed for external connection is done with a solution of polystyrene prepared as described by Dunmore *(2)*. One of the chief aims of the design is good sensitivity with minimum sorption of moisture from the small space in which the relative humidity is measured.

After an aging period of about 2 weeks, these small electric hygrometers give accurately reproducible results. The current corresponding to the adopted

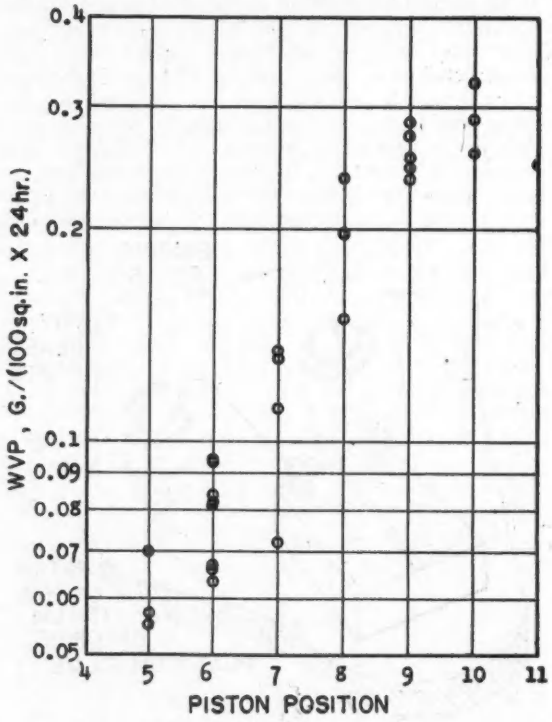


FIG. 5
Correlation of Gravimetric Rate and Piston Position (Steady-State Method)

standard relative humidity $r_2$ is noted conveniently by simply placing the glass plate holding the hygrometer over a shallow vessel containing a saturated salt solution which gives, at the room or cabinet temperature employed, the desired relative humidity. After the brief period required for equilibrium to become established, the meter is read. Where the dynamic method is employed, either of two procedures may be followed: *(a)* calibration of the method may be effected by plotting observed rate of rise of meter reading against true permeability for the type of specimen to be controlled (this is the simpler and preferred procedure where only one unit is employed), or *(b)* the various hygrometers used in several instruments may be calibrated so that the relative humidity may be obtained from the meter reading, and then the rate of rise of relative humidity plotted against true permeability for the type of specimen to be controlled (the theoretically preferred procedure where several units are employed). However, if care is exercised in making several hygrometer elements, and the same PVA-lithium chloride mixture is applied to all the elements, the slopes of the individual calibration curves relating electric

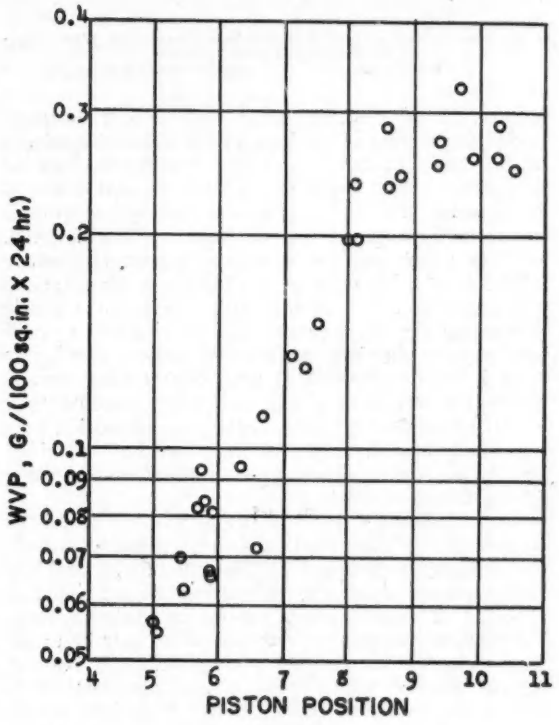


FIG. 6

**Correlation of Gravimetric Rate and Interpolated Piston Position (Steady-State Method)**

current and relative humidity probably will be found to be similar within the limits of error of the method, even though the absolute values may differ. Where this is found to be the case, the simpler procedure *(a)* above may be followed, even when there are a number of testing instruments, since a calibration giving the relationship between rate of rise of current against permeability obtained for one or two instruments would be found valid for all the instruments.

Even after aging, these small units exhibit a small, but not objectionable fatigue phenomenon. Upon connecting a unit into the measuring circuit, it is observed

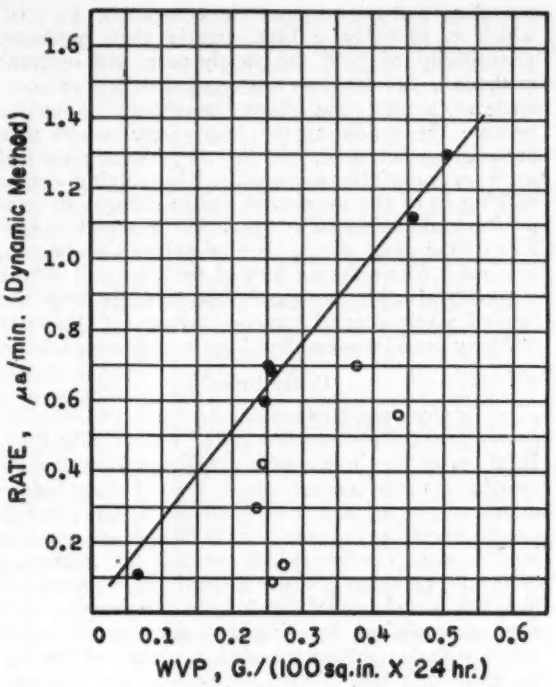


FIG. 7

**Correlation of Rate of Rise of Hygrometer Current and Water-Vapor Permeability—Coated Papers**

● Vapor Barrier to 50% R.H. ○ Vapor Barrier to 92% R.H.

that the current falls slightly, the drop in 1 minute corresponding to an apparent change of about 1% relative humidity. Error because of fatigue is eliminated by noting the current a definite time interval following connection of the unit into the circuit. In the dynamic method, the time interval has been 20 seconds; in the steady-state method, 1 minute. The same time intervals are employed in calibrating the units and, as the performance reproduces itself with a high degree of accuracy, there is no significant error attributable to fatigue. The fatigue effect is reproducible after 5 minutes or a longer period of time after disconnecting an element. (In nearly all procedures followed thus far, an element has been disconnected immediately after taking the meter reading.)*

Similar elements are used in both the steady-state and dynamic methods. In either case, the working range should be in the linear portion of the calibration curve for the element, and it should be remembered that, in the steady-state method, the working range is intermediate the values $r_1$ and $r_3$, whereas in the dynamic method the range commences with $r_3$. As an illustration, take the case for which $r_1 = 92\%$ R. H., $r_2 = 65\%$ for the steady-state method, and $r_3 = 50\%$. It is evident that the elements for the dynamic method should be prepared with PVA having a slightly higher lithium chloride content than that used in elements for the steady-state method.

### THE WAX SEAL

The simple mold and procedure used in sealing a specimen to the base vessel (a glass crystallizing dish in this work) are about the same as those described in Part III *(5)*. The mold was deepened somewhat to increase the space between the specimen and the

* Since this report first appeared, it has been found possible to reduce fatigue effects by decreasing the a.c. voltage across the series combination of hygrometer element, rectifier-meter, and resistor to about 2 volts.

top glass plate. This space is now about 11 mm., which is probably a little greater than optimum. (Sensitivity of both the steady-state and dynamic methods is decreased as this separation is increased; however, a very small separation should be avoided because the action of the hygrometer would then become too localized, and in the dynamic method accuracy would become impaired by bulging out or sucking in of the membrane due to changes in temperature and atmospheric pressure.) The bottom surface of the mold should be made plane and smooth, because it forms the top rim of the wax wall, where a good seal with the glass plate is made with the help of a thin film of stopcock grease ("Celvacene" of heavy grade was employed in the present work).

### Procedures

In the work reported herein, experiments were conducted in a room controlled at 73° F. and 50% R.H. In all cases specimens were conditioned in this atmosphere for a period of at least 1 day before measurements of any sort were made. Gravimetric measurements were made with the specimens actually used in the electric methods, so that the influences of sample variation (accidental pin-holes, nonuniform film thickness) would be largely eliminated. This was accomplished by simply weighing the lower vessel with the specimen sealed in place and the top structure removed. During the gravimetric measurements the various units were placed in an air stream of velocity sufficiently high to ensure that the rate of air movement was not a factor. The relative humidity inside the vessel was maintained at about 92% by means of a saturated solution of ammonium dihydrogen phosphate ($NH_4H_2PO_4$).

In the earliest work, the gravimetric measurements were made first, so that data taken with either of the electric methods were for specimens which had come to equilibrium with relative humidities of about 50% and 92% on the two sides; that is to say, nearly constant rates of transpiration of moisture through the specimens had become established. As is well known, such equilibrium ordinarily requires a period of a few days. Later, during work on the dynamic method, it was considered that the chief application of that method would be in the rapid testing of moistureproof materials immediately after manufacture and, hence, it was decided that the rate of rise of the current through the hygrometer should be obtained soon after sealing the specimen to the crystallizing dish. Following the determination of this rate, which required a time varying from a few minutes to a few hours (the time depending on the quality and nature of the specimen), the weighings were started. The initial permeability obtained by the dynamic method could then be compared with the usual gravimetrically determined permeability.

The standard relative humidity $r_2$ (see Fig. 1) adopted in this work for the steady-state method is 65%. In starting a test, the piston is lowered to its bottom position so that the relative humidity in the intermediate space will rise as fast as possible. The approximate rate of rise is noted, as this gives the operator a preliminary, rough knowledge of the permeability of the specimen under test (this is, in fact, rough usage of the dynamic method). When the relative humidity attains the standard value of $r_2$, the piston is set at a position which the operator judges through experience would be about correct. After a suitable lapse of time, the operator then notes the trend away from the standard relative humidity. If the meter reading continues to increase, the piston setting is too low, and it should be raised; if, on the other hand, the meter reading is observed to fall, the piston had been set too high, and it should be lowered. From time to time the hygrometer is connected into the circuit, the meter reading is noted, and the piston position is changed appropriately until the bracketing settings are obtained. Many specimens can be tested at the same time with a single measuring circuit, because the time required to connect a particular hygrometer and make a reading is only 1 minute. Associated with each testing unit is the meter reading for that unit corresponding to a relative humidity $r_2$ (65% in the present work). (As previously stated, these readings had been obtained by placing the units over a saturated salt solution giving the standard $r_2$.)

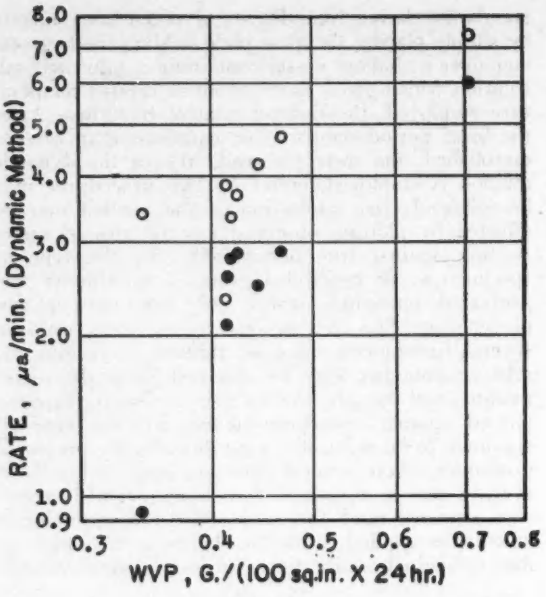


FIG. 8

Correlation of Rate of Rise of Hygrometer Current and Water-Vapor Permeability—Coated Glassines
● Unit No. I-D ○ Unit No. IV-D

In performing a test with the dynamic method the hygrometer is connected into the measuring circuit, the reading is obtained at the noted time, and the unit removed from the measuring circuit. This is repeated at appropriately chosen intervals of time. For each of the many specimens which may be under test, a chart is constructed giving the meter reading against elapsed time. These charts are constructed during the course of observations. A straight line is drawn tangent to each curve at the meter reading corresponding to an arbitrarily chosen relative humidity slightly above the initial relative humidity $r_3$. This procedure largely eliminates difficulty due to anomalous shape of the curve at the foot. In most of the work reported herein, the relative humidity chosen for determination of rate of rise of meter reading was 53%. The rate of rise of meter reading is obtained by noting the slope of the tangent line in the usual fashion. The rates for a given type and grade of moistureproof sheeting are then plotted against gravimetrically determined water vapor permeability, and the correlation chart so obtained may be subsequently employed for the control testing of sheeting of the given type and grade. A typical chart showing the variation of meter reading with time is

given in Fig. 4 (the specimen in this case was a moistureproofed glassine paper).

## Results

Data obtained with the steady-state method and limited results obtained in some preliminary work with the dynamic method are presented in Table II. Samples 73319 to 73323 were papers coated on one side with a moistureproof barrier. Sample 110360 was a board coated with a moistureproof barrier and greaseproof paper. Sample T-A was an asphalt-impregnated kraft, and the remaining samples (T-B through T-E) were kraft paper coated on one side with asphalt. The second column gives the weights of the 4 by 4-inch specimens employed in the tests. The third column states whether the moistureproof barrier, if a single barrier existed, faced the higher or lower relative humidity. The gravimetrically determined permeabilities are given in the fourth column. The number of the hygrometer element and the current through the element at a relative humidity of 65% are given, respectively, in the fifth and sixth columns. The steady-state piston positions and the corresponding meter readings are given in the seventh and eighth columns. The last column gives the rate of rise of the meter reading, observed according to the dynamic method *after* the gravimeteric determination had been made.

The piston positions are compared with the gravimetrically determined rates in Fig. 5. Relatively good correlation is seen to exist between the two quantities. In Fig. 6 interpolated piston positions, computed from the data of Table II, are used. Ordinary linear interpolation admittedly introduces error because of the nonlinear relationship between permeability and piston position but is justified in view of the smallness of the error relative to the magnitude of error that may be tolerated in practice. A fairly accurate correlation obtains between the interpolated piston positions and the gravimetrically determined permeabilities. The knee in the curve at about position nine is believed to be due very largely to the fact that, in that vicinity, the resistance of the capillary system is no longer large in comparison with that of the main cylinder. However, the curve has satisfactory shape in the region of greatest interest (lower permeabilities). The data presented in Table II and Figs. 5 and 6 were obtained with three steady-state instruments made according to the same design.

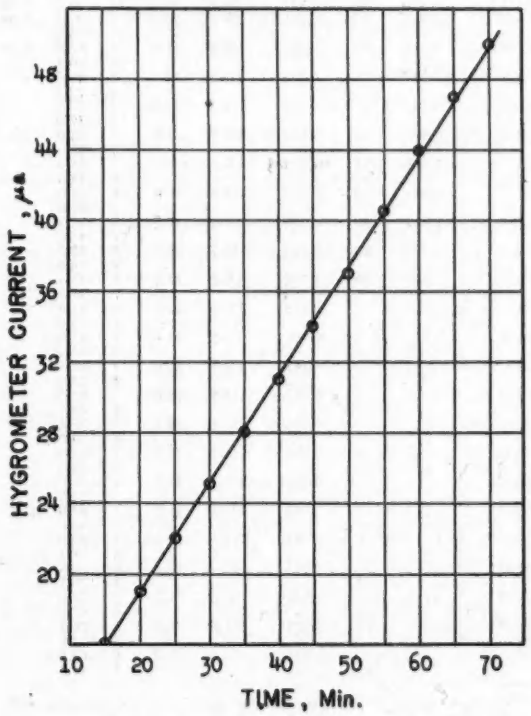


FIG. 9
Increase of Hygrometer Current with Time for Kraft Duplex Papers

The remaining data presented in this report relate to the dynamic method. Whereas a correlation chart for the steady-state method, like that shown in Fig. 6, is expected to be independent of the nature of the moistureproof sheeting, a chart for the dynamic method will, as already discussed, depend upon factors not related to the true permeability. The dynamic method rates for the first dozen specimens listed in Table II are plotted in Fig. 7, against the gravimetrically determined permeabilities. The permeabilities were determined prior to the measurements with the dynamic method. If one differentiates between points for the barrier facing the crystallizing dish and those for the barrier facing the space initially at 50%, it will be seen that the latter correlates well with the true permeabilities. The points for the barrier facing the crystallizing dish exhibit very poor correlation; for example, the direct rate for Specimen 73321-2 is over four times that observed for Specimen 110360-1, yet the former has about the same permeability as that of the latter (actually a little less). This is in accordance with the theory (see previous discussion and the appendix), because the latter is much heavier than the former (3.961 grams as compared with 1.154 grams for a 4 x 4-inch square).

Further data obtained with the dynamic method after the permeabilities had been measured by the gravimetric method are shown in Fig. 8. The data there presented are for a set of specimens of a single sample, a moistureproof glassine paper, so that the influences of varying weight of specimen, absorptive characteristics, etc., should be typical of the normal production of the finished material of a given type and grade. The open circles represent the rates determined with a normal hygrometer (length 0.5 inch). The solid dots represent rates determined with an element of earlier design and having a length five times that of a normal element. It seems probable that the reason for the difference between the two sets of points lies in the greater absorption of moisture by the longer element. The correlation established with either element appears to be rather good.

Each point shown in Fig. 8 was established as previously described by means of a chart of meter readings plotted against elapsed time. Each chart required an expenditure of only about 20 minutes, and in nearly all cases observations over a period of 10 minutes would have sufficed to establish the tangent line. It is seen then, that having established a correlation between the dynamic method rate and the true permeability for this type and grade of moistureproof sheeting, an individual measurement could be made in a matter of only several minutes. This presumes, however, that the specimen has been sealed to the crystallizing dish for a period of time long enough to make a gravimetric determination; that is, steady-state conditions had been established. Therefore, it was desirable to perform tests with the dynamic method on specimens which had been sealed to the

crystallizing dish for a relatively brief period of time.

The next series of tests were made with this objective. The specimens of a sample of a kraft duplex sheet, laminated with asphalt and exhibiting the normal weight variations of manufacture, were sealed to the crystallizing dishes, and meter readings were commenced approximately 1 hour after sealing. Because of the relatively large mass of unimpregnated kraft paper lying between the central barrier of asphalt and the space containing the hygrometer, the individual charts for the rate determinations had to cover intervals ranging from about 1 to 3 hours. One of the charts for this sample is shown in Fig. 9. The rates are correlated with the subsequently determined permeabilities (which required weighings over several days) in Fig. 10. The specimens exhibited an unfortunate tendency to cluster, but the several determinations show fair correlation. The discrepancies from perfect correlation are undoubtedly intrinsic to the method itself; they would be inherent in any method which does not involve final measurement under steady-state conditions. If the sensitivity of the gravimetric method would permit sufficiently accurate weighings during the first 3 hours to result in an accurate initial rate for that brief period, the correlation between the initial gravimetric rates and the rates obtained by weighing over a period of a few days should be similar to that shown in Fig. 10. However, the sensitivity of the gravimetric method is not sufficient for reliable determination of initial rates for specimens of low permeability. The sensitivity of the dynamic method is vastly superior to that of the gravimetric method. There appears to be no other reason for the dynamic method having the capacity to indicate, at least approximately, the permeability of a specimen through measurements made over a period varying from a few minutes to a few hours.

Data obtained under similar conditions for moistureproof cellophane are presented in Fig. 11. Here the correlation is not as good as one would wish to have it, the rate for one point at 0.23 g./100 sq. in. /24 hr. being almost twice the value corresponding to the relationship established by the several points. However, the method was found to serve effectively for the ready detection of specimens which had higher than normal permeability. Data obtained in the same manner for moistureproof glassine paper samples are given in Fig. 12. The correlation is fair and, again, it was found that the dynamic method was very effective in the quick detection of specimens of subnormal moistureproofness.

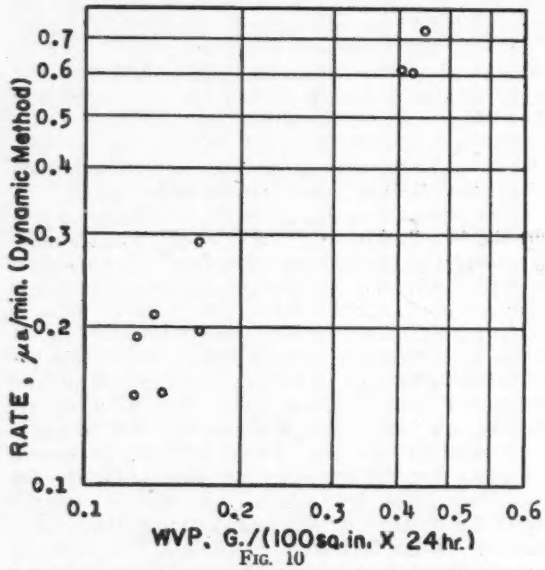


FIG. 10

Correlation of Rate of Rise of Hygrometer Current and Water-Vapor Permeability—Kraft Duplex Paper

## Conclusions

The basic method suggested in Part I *(1)* for evaluating water vapor permeability through measurement of relative humidity instead of weight can be made effective and accurate in the form of the steady-state method and, under stated limitations and conditions of procedure, the dynamic method may

TABLE II.—COMPARISON OF GRAVIMETRICALLY DETERMINED PERMEABILITIES WITH SUBSEQUENTLY DETERMINED STEADY-STATE AND DYNAMIC METHOD VALUES

| | | | | Steady-State Method | | | | |
|---|---|---|---|---|---|---|---|---|
| Sample | Weight 4×4 in. gram | Vapor Barrier Facing R.H., % | g./(100 sq. in. × 24 hr.) 50 and 92% R.H. at 73° F. | Hygrometer Element No. | Current at 65% R.H., μa | Piston Position | Meter Reading, μa | Dynamic Method, μa/min. |
| 73319-1 | 2.695 | 92 | 0.272 | IV-S | 24.5 | 9 | 27.0 | 0.14 |
| | | | | | | 10 | 21.0 | |
| 73319-2 | 2.675 | 50 | 0.248 | III-S | 81.0 | 10 | 89.0 | 0.60 |
| | | | | | | 11 | 74.0 | |
| 73320-1 | 1.232 | 50 | 0.458 | IV-S | 25.0 | 11 | 46.0 | 1.12 |
| 73320-2 | 1.239 | 92 | 0.378 | III-S | 81.0 | 10 | 89.0 | 0.76 |
| | | | | | | 11 | 84.5 | |
| 73321-1 | 1.139 | 50 | 0.506 | IV-S | 25.0 | 11 | 60.5 | 1.30 |
| 73321-2 | 1.154 | 92 | 0.244 | III-S | 81.0 | 8 | 96.0 | 0.42 |
| | | | | | | 9 | 76.0 | |
| 73322-1 | 1.478 | 92 | 0.236 | III-S | 82.0 | 8 | 93.0 | 0.30 |
| | | | | | | 9 | 75.5 | |
| 73322-2 | 1.400 | 50 | 0.251 | V-S | 56.0 | 9 | 63.0 | 0.70 |
| | | | | | | 10 | 45.0 | |
| 73323-1 | 1.430 | 50 | 0.257 | V-S | 51.0 | 10 | 55.0 | 0.68 |
| | | | | | | 11 | 40.5 | |
| 73323-2 | 1.450 | 92 | 0.437 | IV-S | 25.0 | 11 | 33.0 | 0.53 |
| 110360-1 | 3.961 | 92 | 0.257 | IV-S | 25.0 | 9 | 32.5 | 0.09 |
| | | | | | | 10 | 24.0 | |
| 110360-2 | 4.086 | 50 | 0.066 | III-S | 81.0 | 5 | 87.0 | 0.11 |
| | | | | | | 6 | 80.5 | |
| T-A-1 | 1.197 | .. | 0.285 | III-S | 80.0 | 8 | 90.0 | |
| | | | | | | 9 | 72.5 | |
| T-A-2 | 1.193 | .. | 0.198 | V-S | 50.0 | 8 | 52.5 | |
| | | | | | | 9 | 37.0 | |
| T-B-1 | 0.895 | 50 | 0.323 | IV-S | 23.0 | 9 | 28.0 | |
| | | | | | | 10 | 21.0 | |
| T-B-2 | 0.898 | 92 | 0.082 | V-S | 50.0 | 5 | 63.5 | |
| | | | | | | 6 | 44.5 | |
| T-C-1 | 1.403 | 50 | 0.057 | III-S | 80.0 | 4 | 86.0 | |
| | | | | | | 5 | 80.0 | |
| T-D-1 | 1.018 | 50 | 0.289 | V-S | 50.0 | 10 | 52.5 | |
| | | | | | | 11 | 45.0 | |
| T-D-2 | 1.022 | 92 | 0.236 | III-S | 80.0 | 8 | 82.0 | |
| | | | | | | 9 | 66.0 | |
| T-E-1 | 1.259 | 50 | 0.094 | IV-S | 23.5 | 6 | 27.5 | |
| | | | | | | 7 | 17.0 | |
| T-A-1* | .... | .. | 0.135 | IV-S | 22.0 | 6 | 31.0 | |
| | | | | | | 7 | 23.0 | |
| T-A-2* | .... | .. | 0.131 | V-S | 51.0 | 7 | 57.0 | |
| | | | | | | 8 | 40.0 | |
| T-B-1* | .... | .. | 0.198 | IV-S | 22.0 | 7 | 42.0 | |
| | | | | | | 8 | 22.0 | |
| T-B-2* | .... | .. | 0.062 | III-S | 79.0 | 5 | 92.0 | |
| | | | | | | 6 | 68.5 | |
| T-D-1* | .... | .. | 0.150 | IV-S | 22.0 | 7 | 28.5 | |
| | | | | | | 8 | 16.0 | |
| T-D-2* | .... | .. | 0.093 | III-S | 79.5 | 5 | 95.0 | |
| | | | | | | 6 | 74.0 | |
| T-E-1* | .... | .. | 0.055 | IV-S | 21.5 | 4 | 38.0 | |
| | | | | | | 5 | 22.0 | |
| T-A-1** | .... | .. | 0.084 | V-S | 51.5 | 5 | 87.0 | |
| | | | | | | 6 | 43.0 | |
| T-A-2** | .... | .. | 0.081 | III-S | 79.0 | 5 | 97.0 | |
| | | | | | | 6 | 77.5 | |
| T-B-1** | .... | .. | 0.111 | III-S | 79.5 | 6 | 89.5 | |
| | | | | | | 7 | 75.5 | |
| T-D-1** | .... | .. | 0.067 | V-S | 51.5 | 5 | 85.0 | |
| | | | | | | 6 | 47.0 | |
| T-D-2** | .... | .. | 0.070 | IV-S | 21.0 | 5 | 26.5 | |
| | | | | | | 6 | 13.5 | |
| T-B-1+ | .... | .. | 0.072 | V-S | 51.0 | 6 | 64.0 | |
| | | | | | | 7 | 44.0 | |

* Specimen above of the same number dabbed in several spots with rosin-beeswax.
** The same treatment a second time.
\+ The same treatment a third time.

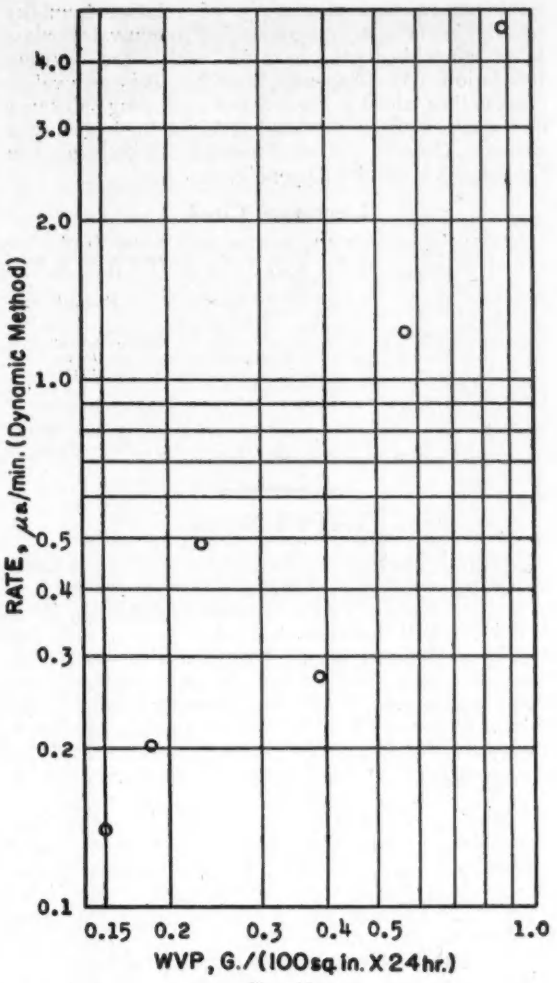


FIG. 11
Correlation of Rate of Rise of Hygrometer Current and Water-Vapor Permeability—Coated Cellophanes

be employed as an approximate but exceedingly rapid method for evaluating water vapor permeability.

The advantages of the steady-state method over the gravimetric method are *(a)* simpler manipulations in obtaining and handling data in arriving at the permeability, and *(b)* an appreciable saving in over-all time required for a test. The chief and all-important advantage of the dynamic method is that, in some cases at least, it fills a long needed method of determining, within a reasonable time after manufacture, whether the moistureproof sheeting under production is up to standard.

Further work on the dynamic method will appear in Instrumentation Studies LIII.

## Appendix

For the purpose of estimating the influence on the test results obtained with the dynamic method of variables such as specimen weight, thickness of the narrow space above the specimen, etc., and also of obtaining justification for the shape of the observed curves of the change of $r_2$ (see Fig. 1) with time, the following approximate theory has been worked out. Only the essential steps are given.

Fig. 13 shows a rather general case in which there is a mass $m$ of absorbing substance above a moisture-resistant barrier. Because the permeability of this layer is extremely high in comparison with that of the barrier, we consider that the relative humidity $r_2'$ in the air voids of this layer is essentially constant across the small thickness of this layer (this thickness is exaggerated in Fig. 13). The relative humidity $r_2$ is considered to be that existing at any moment in a central plane in the narrow space of volume $V$. The area of the specimen under test is $A$. In the case worked out here, $r_3$ is the initial value of $r_2$, and $r_2 > r_1$. The time rate of transpiration of water vapor through the barrier is assumed proportional to the difference in partial pressure of water vapor across the barrier (an assumption which is often not valid, but is sufficiently reliable for the purposes of the theory), or

$$dw/dt \cong PAp(r_2' - r_1), \quad (1)$$

where $P$ is a constant of proportionality, and $p$ is the pressure of saturated water vapor. If $m_w$ is the water content of the absorbing layer over the barrier,

$$dw/dt = -dm_w/dt = -\rho V\, dr_2/dt, \quad (2)$$

where $\rho$ is the density of saturated water vapor at the temperature of the apparatus. Although it is well known that there is a hysteresis in the relation between water content and relative humidity, we assume for the purpose of theory that

$$m_w = hmr_2'. \quad (3)$$

Moisture leaving the layer above the barrier diffuses through still air into the narrow space of volume $V$. This is expressed by Equation 4:

$$\rho V\, dr_2/dt = -k_2A(r_2 - r_2'), \quad (4)$$

where $k_2$ involves the diffusion coefficient for mois-

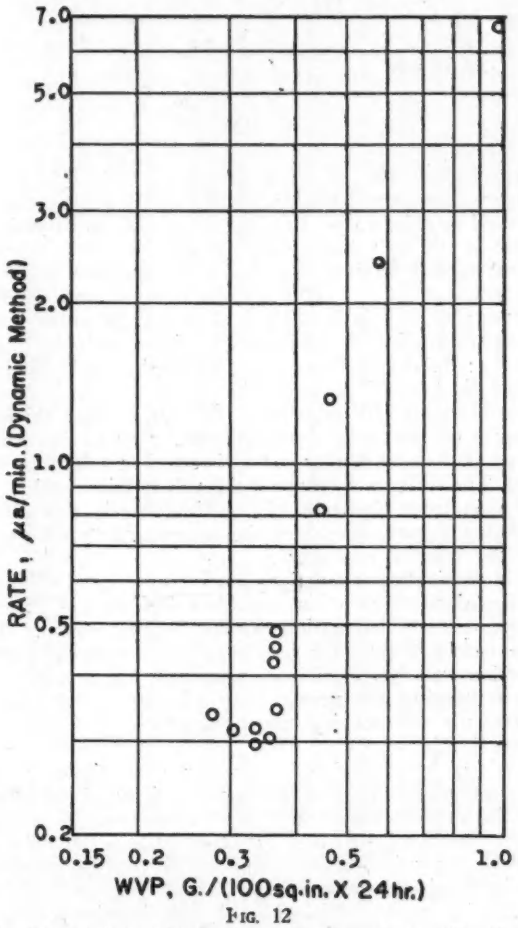


FIG. 12
Correlation of Rate of Rise of Hygrometer Current and Water-Vapor Permeability—Coated Glassines

ture in still air, the distance $h$, and other factors. Utilizing these four equations, and eliminating $r_2'$, we obtain differential equation:

$$d^2r_2/dt^2 + a\,dr_2/dt + br_2 = br_1 \qquad (5)$$

where

$$a = (pP/h_2m') + (h_2/ph) + (h_2/h_1m') \qquad (5')$$

and

$$b = pPh_2/h_1m'ph,$$

in which $m'$ is the mass of unit area of the specimen. Although the solution of Equation (5) involves a number of steps, the procedure is straightforward, and leads to the solution:

$$r_2 = [(r_2 - r_1)/2\sqrt{a^2-4b}] \times \left[(a + \sqrt{a^2-4b})\,e^{-(a-\sqrt{a^2-4b})\,(t/2)} + (-a + \sqrt{a^2-4b})\,e^{-(a+\sqrt{a^2-4b})\,(t/2)}\right] + r_1 \qquad (6)$$

When plotted, this equation leads to the observed form of curve—that is, one which starts at $r_2$ and curves to an asymptotic approach to $r_1$. The rate at which this curve changes (which is a measure of the sensitivity of the method) depends on the following factors: *(a)* The pressure of saturated water vapor (see discussion below under *(e)*). *(b)* The permeability of the barrier; as this factor increases, the observed rate increases. *(c)* The moisture absorption

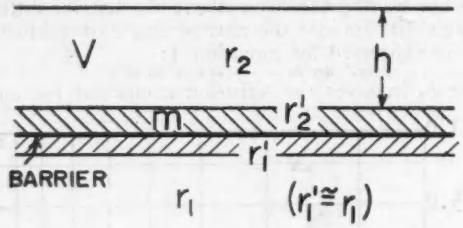


FIG. 13

capacity ($k_1m'$), in effect, the basis weight of the layer above the barrier; as this increases, the observed rate decreases. *(d)* The diffusion rate of moisture in still air; this factor is ordinarily not of great importance; an increase causes an increase in the observed rate. *(e)* The density of saturated water vapor; as this is increased, the rate decreases but temperature increment causes an increase in both $p$ and $\rho$; these two factors are involved principally in the ratio $p/\rho$ and, hence, as the temperature increases, the observed rate increases. *(f)* The vertical thickness $h$ of the space above the specimen; as this important variable increases, the observed rate decreases. *(g)* The difference between the values of $r_2$ and $r_1$; as seen from Equation (6), an increase in this difference directly increases the observed rate of rise of the relative humidity $r_2$.

In particular, calculations made with typical values assigned to the various constants showed the great importance of absorption capacity of that portion of the specimen over the barrier. As the mass of that portion was decreased from a typically large value to zero, keeping the permeability of the barrier constant, the calculated rate of change of $r_2$ increased several fold.

When the barrier under test has a very low water vapor permeability and the hygroscopicity of the side of the barrier facing the hygrometer element is small, the accurate measurement of water vapor permeability by the dynamic method requires a correction for the moisture absorption by the hygrometer element. This correction can be achieved by determining the portion of the moisture absorption isotherm of the hygrometer element over the range of relative humidity covered in the test, and converting to equivalent mass $m$ of absorbing substance for which the constant (Equation (3), Appendix) is $k_1$. This equivalent mass is then added to the mass of absorbing substance on the upper side of the barrier, facing the hygrometer element. The sum of the absorbing masses is used in Equation (3) of the Appendix.

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2. Dunmore, F. W., Improved electric hygrometer. *J. Research Natl. Bur. Standards* 23: 701-714 (1939).

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3. Dunmore, F. W. Personal communication.
4. See for example, John Strong, *et al.*, Procedures in experimental physics. New York, Prentice-Hall, 1939. 642 p.
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## TAPPI Notes

Arthur J. Haug, formerly with the Tennessee Eastman Corporation, Oak Ridge, Tenn. is now a student at the Institute of Paper Chemistry, Appleton, Wis.

The TAPPI Kalamazoo Valley Section and the Michigan Division of the Superintendents Association will hold a joint meeting at the Park American Hotel, Kalamazoo, Mich., on Thursday, January 10, 1946 at 6:30 p.m. Otto Kress of the Institute of Paper Chemistry, Appleton, Wis., will discuss conditions in European paper mills. Frank French of the French Paper Company, Niles, Mich. will be toastmaster.

Major Morris Housen has returned to the Erving Paper Mills, Erving, Mass., as president and treasurer.

Charles N. Egan has resigned, as of December 31st, as vice president and general manager of the Hennepin Paper Company and will be located at 111 West Washington St., Chicago, Ill.

Donald D. Davis, president of the Minnesota and Ontario Paper Company, has replaced R. H. M. Robinson as corporate official representative in the Technical Association.

Paul Easton of the Hercules Powder Company has been transferred from Kalamazoo, Mich., to 5228 N. Hopkins St., Milwaukee 9, Wis.

L. A. Carpenter has replaced N. H. Bergstrom as corporate official representative of the Bergstrom Paper Company in the Technical Association.

Edward H. Gross of the Bakelite Corporation has been transferred from Hartford, Conn. to 30 East 42nd Street, New York, N. Y.

R. A. Campbell has replaced C. K. Andrews as corporate official representative of the Blandin Paper Company in the Technical Association.

The Western New York Group of the TAPPI Empire State Section will meet at the Prospect House, Niagara Falls, N. Y., on Wednesday, January 9, 1946 at 6:45 p.m. L. J. Murphy, Electrical Engineer for the Westinghouse Electric Corporation will talk on Paper and Electronics.

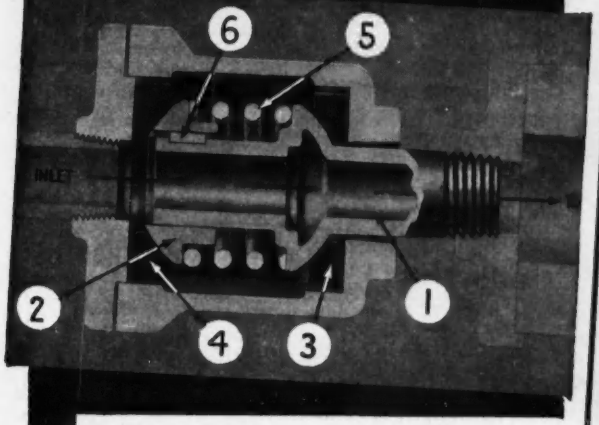
William M. Shoemaker has joined the Downingtown Mfg. Company, Downingtown, Pa., as a staff engineer.

Albert E. Bartlett, formerly of W. C. Hamilton & Sons, is now an engineer for the Bagley & Sewall Company, Watertown, N. Y.

Merrill Norwood is now paper mill superintendent of the St. Helens Pulp and Paper Company, St. Helens, Ont.

# 4 Good Reasons Why JOHNSON ROTARY JOINTS

Speed Up Production and Cut Down Maintenance




1 **COMPLETELY PACKLESS.** Rotating member consists of nipple (1) and sliding collar (2), keyed together (6). Seal is accomplished by carbon graphite seal ring (3), forced by pressure tightly against nipple. Positive seal—no stuffing boxes or steam fits to repack. Carbon graphite ring (4) serves as bearing.

2 **SELF-OILING.** Seal ring (3) and bearing ring (4) are of long-lived carbon graphite—require no lubrication. Your maintenance man will go for this in a big way.

3 **SELF-ADJUSTING.** Spring (5) is for initial seating only. Joint in operation is pressure sealed; the higher the pressure, the tighter the seal, as it should be. No lost time due to repacking or repairing because of misalignment.

4 **SELF-ALIGNING.** Ball and socket joints between rotating member and rings compensates for angular misalignment of pipe. Space between nipple and housing provides for lateral misalignment.

● Yes, Johnson Rotary Pressure Joints end all the troubles of the old style stuffing boxes and steam fits. In addition, they provide a simple way to install more efficient methods of syphon drainage. And—very important—is the fact that Johnson Joints can pay their own way out of savings in maintenance alone.

**WRITE FOR COMPLETE INFORMATION**

**The Johnson Corporation**

828 WOOD STREET THREE RIVERS, MICH.

**Make Your Compressed Air Come Clean**

with the Johnson Separator. Employs the two best principles of separation—expansion and change of direction; removes 99% plus of trouble-causing water, dirt and oil from compressed air. Simple design and construction insures long life. Also available for service on steam lines.

*Write for Bulletin on Johnson Separation Devices*

# DELIVERIES EASIER ON BAUER PULPERS

"That's right, John. Deliveries really are improving, and we say that despite the recent step-up in orders. Bauer pulpers ordered now will go forward reasonably soon—and that's a lot better than we could do in '44 and '45."

***Yes, Bauer pulpers are in demand and are being installed to***

Salvage and turn screen rejects into A-1 stock.

Develop greater freeness and raise the mullin and tear on semi-chemical other stocks.

Two sizes, 36" and 24" disc, in full range of plate patterns.

Bauer

THE **BAUER BROS.** CO.

SPRINGFIELD, OHIO

# New York Paper and Pulp Market Review

## Paper and Wood Pulp Demand Expected To Continue Very Heavy Through First Quarter—New and Old Cotton Rags Are Active—Bagging Shows Little Change — Mills Want More Waste Paper.

Office of the PAPER TRADE JOURNAL,
Wednesday, January 2, 1946

Paper demand in the wholesale market continues heavy into the new year with the expectation generally expressed in the industry and trade that a very active market will continue during the first quarter. Holiday observances have seasonally lowered production but there is little doubt that a new high record will be established in paper and pulp production this year.

The index of general business activity for the week ended December 22 rose slightly to 131.1 from 131.0 in the preceding week, compared with 142.4 in the corresponding week in 1944. The index of paperboard production was 149.1, compared with 158.5 in the preceding week, and with 149.5 for the corresponding week in 1944.

The most important news at the year's end was the removal of all newsprint controls on December 31, 1945. Now, the distribution of newsprint will be on a normal voluntary basis. Demand is heavy and a relatively tight supply situation is likely to continue through the first quarter.

The increasing output in book paper indicates the steady improvement that may be expected in the supply of this type of paper for magazines, books and general printing.

### Wood Pulp

The pulpwood supply situation is favorable, and while more woods workers are needed, and some minor labor disputes are reported, sufficient pulpwood to meet the increased needs of 1946 is expected to be harvested.

Wood pulp supply is currently tight. No substantial improvement is expected until near the end of the first quarter. Demand is expected in most quarters to continue very heavy until the first half of this year. is well advanced.

### Rags

Cotton cuttings continue in heavy demand. Reports this week indicate no improvement in supplies. Prices are very firm at ceiling levels.

Trading in old rags continues active. Demand of roofing mills is steady and in view of the heavy demand for roofing and floor covering products, a strong market in rags will be maintained for many months in the future. Prices are strong at ceiling levels.

### Old Rope and Bagging

Mill demand for Manila rope continues heavy and in excess of limited supplies. Jute and sisal fiber is reported in adequate supply. Prices are unchanged.

The scrap bagging market is currently reported as continuing its firm tone of last week. Some quarters report that packers are not anxious to sell at current prices. No material change in prices or demand has been reported at this date.

### Old Waste Paper

Mill demand for all grades of paper stock continues strong. Inventories at the mills are improving, but many current reports indicate the desire of mills to more rapidly build up inventories to be in a more normal position to meet the heavy demand for all paperboard products, which are expected to continue very active in the market throughout the first half of this year.

Prices are firm at ceiling levels on all grades of old waste paper.

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## MARATHON PULP MILL PROGRESSING

*(Continued from page 10)*

cents an hour increase in wages as of April 25." Mr. Arnold estimated that $30,000 in back pay was due the striking employees.

The union leader also charged that the sale of the Mosinee firm's Michigan holdings to Roddis Lumber and Veneer Company was "a deliberate attempt to avoid compliance with the WLB directive."

Mosinee company officials refused to comment, pending receipt of the official announcement of the strike.

### K-C Workers Retire on Pension

Three Kimberly, Wis., mill employees of the Kimberly-Clark Corporation will retire on pension on January 1. They are A. W. Fulcer, Joe Mennen and Ed Albers. They have a combined service record of 106 years. None has ever had a lost-time accident. Mr. Mennen started work in July, 1905; Mr. Fulcer, on March 9, 1919, and Mr. Albers began on March 7, 1917.

### Build Dam to Protect Building

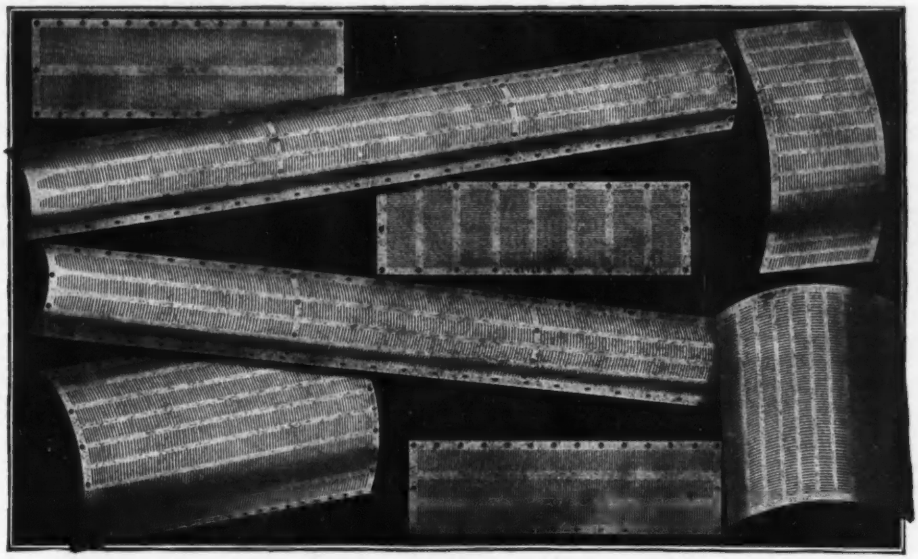
A small dam, about 80 feet across the head-race between the Atlas mill of the Kimberly-Clark Corporation and its power plant, is being built by the Flour Brothers Construction Company, at Appleton, Wis. The dam is intended to protect the Atlas building from being undermined. It is 10 feet thick at the bottom and tapers to 3 feet at the top.

### Sawyer Paper Corp. Formed

Articles of incorporation have been filed with the register of deeds in Winnebago County, Wisconsin, for the Sawyer Paper Corporation, Neenah, Wis., with a capital stock of 1,000 shares having a par value of $100 each. The company will manufacture paper boxes, cartons and containers and other paper products. The articles were signed by M. L. McCarthy and Christine Peterson, Oshkosh, and John W. Joanis, Washburn, Wis.

### Dr. Van Horn Addresses Chemists

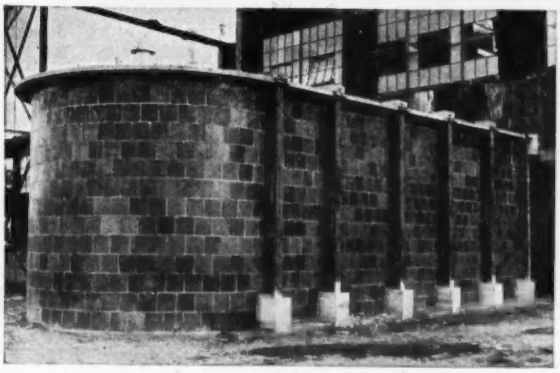
Dr. William Van Horn of the Institute of Paper Chemistry, Appleton, Wis., addressed the Northeast division of the American Chemical society on "Biology of Stream Pollution" Tuesday evening, December 18, at Science Hall, Lawrence College, Appleton, Wis. A 6:30 dinner at the Copper Kettle, Appleton, preceded the meeting.



**"HARDY" BRONZE and CHROME-NICKEL-STEEL SCREEN PLATES.**

## MAGNUS METAL CORP. FITCHBURG, MASS.

**You Paper Mill Men** • *take a Tip on Kalamazoo Tile Stock Tanks and Chests* • *you can't beat them for* **STRENGTH** *and* **DURABILITY** •



**Kalamazoo Vitrified Glazed Tile** *is a "Natural" for Paper Mill Needs—*

Smooth, hard, strong, easily cleaned and highly resistant to chemical action, this marvelous vitrified glazed tile type of construction is preferred by scores of leading paper mill executives and engineers. Adaptable for stock tanks and chests of all kinds. Costs no more than concrete tanks that require constant maintenance expense.

An exclusive method of glazed tile tank construction developed by Kalamazoo engineers. It provides greater flexibility and lower cost for all paper mill stock handling problems. Immediately available.

● **Any Size or Shape Desired—**

Wide, narrow—shallow or deep. Round, rectangular or square. Half-round or tapered bottom and corners. Midfeathers and fins where needed to control stock flow. Adaptable to pumps or agitators. Construction individually designed to meet space, tonnage or production requirements.

**Ask for engineering data.**

**Kalamazoo TANK & SILO CO.**
KALAMAZOO - MICHIGAN

# MISCELLANEOUS MARKETS

Office of the PAPER TRADE JOURNAL,
Wednesday, January 2, 1946.

BLANC FIXE—Quotations on blanc fixe continue unchanged. Demand is reported fair. The pulp is currently quoted at $40 per ton, in barrels, at works; the powder is currently quoted at $60 per ton, f.o.b. works.

BLEACHING POWDER—All-over current demand continues active. Supply situation is reported good. Quotations continue unchanged. Prices on bleaching powder range from $2.50 to $3.10 per 100 pounds, in drums, car lots, at works.

CASEIN—OPA maximum prices on processed acid-precipitated casein are as follows: 10,000 pounds or more, 24 cents per pound; 2,000 pounds, 24¼ cents per pound; less than 2,000 pounds, 24¾ cents per pound, f.o.b. shipping point. Imported 24 cents.

CAUSTIC SODA — Demand continues heavy. Deliveries continue slow. Supply tight in dry grades. Solid caustic soda is quoted at $2.30 per 100 pounds; flaked and ground is quoted at $2.70 per 100 pounds.

CHINA CLAY — Quotations on china clay are unchanged. Current demand is reported fair. Domestic filler clay is currently quoted at from $7.50 to $15 per ton; coating clay is quoted at from $12 to $22 per ton, at mine. Imported clay is quoted at from $13 to $25 per long ton, ship side.

CHLORINE—Demand heavy with temporary short supply. Paper requirements fully met. Quotations unchanged. Chlorine is currently quoted at $1.75 per 100 pounds, in single unit tank cars, f.o.b. works.

ROSIN—No offerings and sales. "G" gum rosin is quoted at $6.74 per 100 pounds, in barrels, at Savannah; "FF" rosin at $6.70 per 100 pounds in barrels, at New York; seventy per cent gum rosin size at $6.95 per 100 pounds, f.o.b. works.

SALT CAKE—Prices on salt cake are reported unchanged for the current week. Consumption is reported increasing this week. Domestic salt cake is quoted at $15 per ton, in bulk. Chrome salt cake is quoted at $16 per ton. All prices in car lots, f.o.b. shipping point.

SODA ASH — Heavy demand continues for all-over requirements. Supply short. Bulk lot shipments steady. Bagged lots still slow. Quotations continue unchanged. Current prices, car lots, per 100 pounds, are as follows: in bulk, $.90; in paper bags, $1.05; and in barrels, $1.35.

STARCH—Corn receipts and shipments lower at good volume with decline in sight, as less cash corn is expected in future due to severe frost damage to crop in some areas. Prices steady. Starch prices continue unchanged. The pearl grade is quoted at $3.72 per 100 pounds; powdered starch at $3.83 per 100 pounds; all prices in bags, car lots, f.o.b. Chicago.

SULPHATE OF ALUMINA — Demand reported steady. Supply situation reported good. Quotations continue unchanged. The commercial grades are quoted at from $1.15 to $1.25 per 100 pounds, in bags, car lots, f.o.b. works. The iron free is currently quoted at $1.75 per 100 pounds, in bags, at works.

SULPHUR—Quotations on sulphur continue to conform to prevailing market prices. Demand active. Annual contracts are quoted at $16 per long ton, f.o.b. mines; the price at Gulf Ports is $17.50 per long ton.

TALC—Prices on talc continue unchanged. Demand good. Domestic grades are currently quoted at from $16 to $21 per ton at mines; Canadian at $24 per ton.

# MARKET QUOTATIONS

All market quotations, excepting those otherwise designated as official OPA maximum prices, are based on the manufacturers' price level as of October 1-15, 1941; maximum wholesale prices are based on the merchants' maximum prices for stipulated quantities at a quoted price to all customers of a like class, as shown by the merchant's sales records of goods delivered during March, 1942. A merchant's price list in effect in March 1942, showing quotations of actual shipments, will establish the current maximum prices.

## Paper

(Delivered New York)

| | | | |
|---|---|---|---|
| **Standard News, per ton—** | | | |
| Roll, contract | *$67.00 | @ | — |
| Sheets | 75.00 | @ | — |
| *OPA Maximum Price. | | | |
| **Kraft—per cwt.—Carload Quantities Zone A, Delivered** | | | |
| Superstandard Wrapping | *$5.25 | @ | — |
| No. 1 Wrapping | *5.00 | " | — |
| Standard Wrapping | *4.75 | " | — |
| Standard Bag | *4.375 | " | — |
| *OPA Manufacturers' Prices. | | | |
| **Tissues—Per Ream—Carlots** | | | |
| White No. 1 | 1.12½ | " | — |
| White No. 1 M. G. | 1.10 | " | — |
| White No. 1½ | 1.00 | " | — |
| White No. 2 | .90 | " | — |
| Anti-Tarnish M.F. | 1.20 | " | — |
| Colored | — | " | — |
| Kraft | .95 | " | — |
| Manila | .90 | " | — |
| **Toilet—1 M. Sheets—Per Case** | | | |
| Unbleached | 4.25 | " | — |
| Bleached | 5.70 | " | — |
| Unbl. Toilet, 1 M. | 4.16 | " | — |
| Bleached Toilet | 5.70 | " | — |
| **Paper Towels, Per Case—** | | | |
| Unbleached, Jr. | 2.20 | " | — |
| Bleached, Jr. | 3.20 | " | — |
| **Manila—per cwt.—C. l. f. a.** | | | |
| No. 1 Jute | 11.25 | @ | — |
| No. 1 Manila Wrapping, 35 lb. | 6.00 | " | 6.25 |
| **Boards, per ton—** | | | |
| News | *50.00 | @ | — |
| Chip | *50.00 | " | — |
| Sgl. Mla. Ll. Chip | *62.00 | " | — |
| White Pat. Coated | *75.00 | " | — |
| Kraft Liners 50 lb. | *63.00 | " | — |
| Binders Boards | 84.00 | " | 116.00 |

*OPA Base Prices per 10 tons. Less than 10 tons but over 3 tons, add $2.50; three tons or less, add $5; regular 35-39 basis, add $5.; basis 40-49, add $2.50; basis 91-100, add $2.50; basis 101-120, add $5.

The following are representative of distributors' resale prices:

**Rag Content Bonds and Ledgers—White, Assorted Items, Delivered in Zone 1:**

| | Bonds | | Ledgers | |
|---|---|---|---|---|
| 100% Rag Ext. No. 1 | $39.10 @ | $46.00 | $40.25 @ | $47.25 |
| 100% Rag | 32.20 " | 37.75 | 33.35 " | 39.25 |
| 85% Rag | " | " | 29.90 " | 35.00 |
| 75% Rag | 23.00 " | 27.00 | 24.15 " | 28.25 |
| 65% Rag | " | " | 22.80 " | 27.75 |
| 50% Rag | 18.70 " | 22.75 | 19.90 " | 24.25 |
| 25% Rag | 16.40 " | 20.00 | 17.55 " | 21.50 |

Colors at $1.00 cwt. extra.

**Sulphite Bonds and Ledgers—White, Assorted Items. Delivered in Zone 1:**

| | Bonds | | Ledgers | |
|---|---|---|---|---|
| No. 1 | $10.55 @ | $12.75 | $11.70 @ | $14.25 |
| No. 2 | 9.65 " | 11.75 | 9.80 " | 13.25 |
| No. 3 | 9.20 " | 11.25 | 9.35 " | 12.50 |
| No. 4 | 8.90 " | 10.75 | 10.85 " | 12.25 |

Colors $1.00 cwt. extra.

**Free Sheet Book Papers—White, Cased Paper. Delivered in Zone 1:**

| | | | |
|---|---|---|---|
| No. 1 Glossy Coated | $13.65 @ | | $15.3 |
| No. 2 Glossy Coated | 12.40 " | | 14.0 |
| No. 3 Glossy Coated | 11.60 " | | 12.2 |
| No. 4 Glossy Coated | 11.15 " | | 12.7 |
| No. 1 Antique (watermarked) | 10.25 " | | 11.7 |
| No. 2 Offset | 9.60 " | | 11.0 |
| A Grade E. F. | 9.35 " | | 10.7 |
| A Grade S. & S. C. | 9.60 " | | 11.0 |
| B Grade E. F. | 8.85 " | | 10.2 |
| B Grade S. C. | 9.10 " | | 10.5 |
| C Grade E. F. | 8.55 " | | 9.7 |
| C Grade S. C. | 8.80 " | | 10.0 |
| D Grade E. F. | 8.25 " | | 9.5 |
| D Grade S. & S. C. | 8.50 " | | 9.7 |

Ivory & India at $.50 cwt. extra.

## Wood Pulp

**OPA Maximum Prices and Canadian Manufacturers Prices, Less Freight Not Exceeding OPA Allowances.**

| | |
|---|---|
| Bl. Softwood Sulphite | $86.00 |
| Unbl. Softwood Sulphite | 74.00 |
| Bl. Hardwood Sulphite | 83.50 |
| Unbl. Hardwood Sulphite | 71.50 |
| Bl. Mitscherlich | 81.00 |
| Unbl. Mitscherlich | 72.00 @ 82.00 |
| N. Bleached Sulphate | 86.00 |
| S. Bleached Sulphate | 79.00 |
| N. Semi-Bleached Sulphate | 82.00 |
| S. Semi Bleached Sulphate | 75.00 |
| N. Unbl. Sulphate | 73.00 |
| S. Unbl. Sulphate | 63.50 |
| Bl. Soda | 76.00 |
| Unbl. Soda | 72.00 |
| Groundwood | 50.00 |

**Transportation Allowances**

**Applying to Producers of Wet Wood Pulp.**

| | Below 50% Air Dry Weight |
|---|---|
| Northeast | $13.50 |
| Lake Central | 13.50 |
| Southern | 16.00 |
| West Coast (in area) | 10.50 |
| West Coast (out area) | 16.50 |

| | 50%-80% Air Dry Weight |
|---|---|
| Northeast | 11.50 |
| Lake Central | 11.50 |
| Southern | 14.00 |
| West Coast (in area) | 9.50 |
| West Coast (out area) | 15.50 |

**Applying to Producers of Dry Wood Pulp.**

| | Above 80% Air Dry Weight |
|---|---|
| Northeast | $8.50 |
| Lake Central | 8.50 |
| Southern | 11.00 |
| West Coast (in area) | 7.50 |
| West Coast (out area) | 13.50 |

Should freight charges actually exceed these allowances, the difference may be added to the maximum prices

## Domestic Rags

**New Rags**

(Prices to Mill f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| **Shirt Cuttings—** | | | |
| New White, No. 1 | 6.50 | @ | 7.25* |
| Silesias No. 1 | — | " | 5.75* |
| New Unbleached | 6.75 | " | 7.50* |
| Blue Overall | — | " | 5.50* |
| Fancy | — | " | 3.50* |
| Washables | — | " | 3.00* |
| Bleached Khaki Cuttings | — | " | 4.25* |
| Unbleached Khaki Cuttings | — | " | 3.50* |

*OPA Maximum Prices

*ESTABLISHED 1871*

# GETZ BROS. & CO.

64 Pine Street, San Francisco 11, Calif.

## EXPORTERS

## • PAPER and BOARD

**BRANCH OFFICES:**

**SHANGHAI • HONGKONG • MANILA**

**SINGAPORE • BATAVIA**

**BOMBAY • CALCUTTA**

**JOHANNESBURG • CAPETOWN**

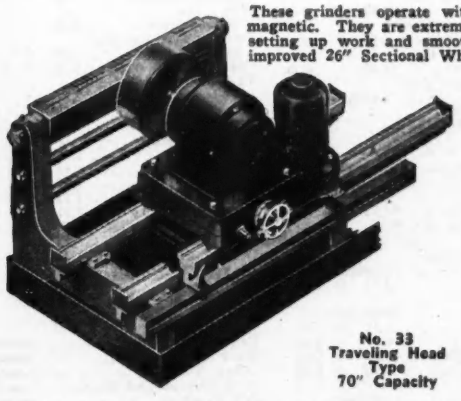
**MEXICO CITY**

## Grinders That Pay a Profit in Any Man's Paper Mill

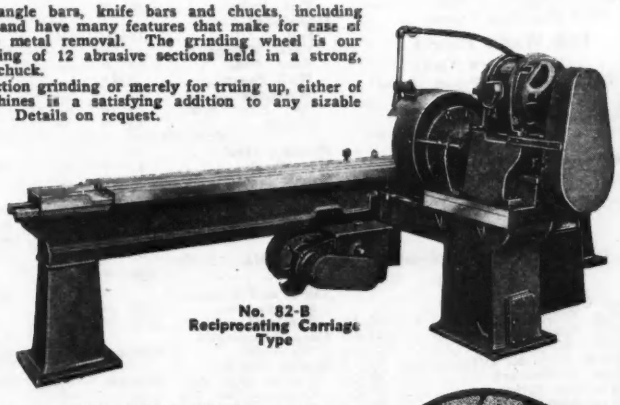
***For Rapid, Accurate Grinding of PAPER, CHIPPER, RAG & VENEER KNIVES AND FOR MISCELLANEOUS GRINDING***

These grinders operate with various angle bars, knife bars and chucks, including magnetic. They are extremely rugged and have many features that make for ease of setting up work and smooth, accurate metal removal. The grinding wheel is our improved 26" Sectional Wheel, consisting of 12 abrasive sections held in a strong, cast steel chuck.

For production grinding or merely for truing up, either of these machines is a satisfying addition to any sizable paper mill. Details on request.



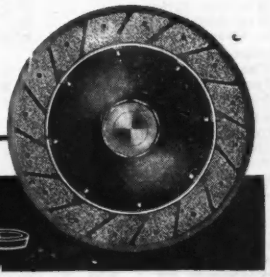
No. 33
Traveling Head
Type
70" Capacity



No. 82-B
Reciprocating Carriage
Type

THE BRIDGEPORT SAFETY EMERY WHEEL CO., INC. • BRIDGEPORT, CONN., U. S. A.

# Bridgeport



**GRINDERS • GRINDING WHEELS • BUFFING LATHES**

| Old Rags | | | |
|---|---|---|---|
| White, No. 1— | | | |
| Repacked | *1.80 | " | — |
| Miscellaneous | *1.20 | " | — |
| White, No. 2— | | | |
| Repacked | *2.90 | " | — |
| Miscellaneous | *2.65 | " | — |
| Thirds and Blues— | | | |
| Repacked | *2.20 | " | — |
| Miscellaneous | *1.30 | " | — |
| Roofing Rags— | | | |
| No. 1 | *1.55 | " | — |
| No. 2 | *1.45 | " | — |
| No. 3 (bagging) | *1.35 | " | — |
| No. 4 | *1.35 | " | — |
| No. 5A | *1.35 | " | — |
| Old Manila Rope | 5.75 | " | — |

* OPA Maximum Prices.

## Foreign Rags

Pre-War Quotations
All Prices Nominal

| New Rags | | | |
|---|---|---|---|
| New Dark Cuttings | 2.25 | @ | 2.40 |
| New Mixed Cuttings | 2.00 | " | 2.20 |
| New Light Silesias | 5.50 | " | 5.75 |
| Light Flannelettes | 5.50 | " | 5.75 |
| New White Cuttings | 7.00 | " | 7.50 |
| New Light Oxfords | 4.00 | " | 4.50 |
| New Light Prints | 3.00 | " | 3.25 |

| Old Rags | | | |
|---|---|---|---|
| No. 1 White Linens | 7.50 | " | 8.50 |
| No. 2 White Linens | 6.50 | " | 7.50 |
| No. 3 White Linens | 4.50 | " | — |
| No. 4 White Linens | 2.25 | " | 3.25 |
| No. 1 White Cottons | 4.25 | " | 4.75 |
| No. 2 White Cottons | 3.25 | " | 3.75 |
| No. 3 White Cottons | 2.50 | " | 3.00 |
| No. 4 White Cottons | 1.90 | " | 2.20 |
| Extra Light Prints | 2.00 | " | 2.40 |
| Ord. Light Prints | 1.75 | " | 2.15 |
| Med. Light Prints | 1.55 | " | 1.95 |
| Dutch Blue Cottons | 2.25 | " | 2.50 |
| French Blue Linens | 3.00 | " | — |
| Checks and Blues | 2.00 | " | — |
| Linsey Garments | 1.90 | " | 2.00 |
| Dark Cottons | 1.50 | " | 1.60 |
| Old Shapperies | 1.30 | " | 1.45 |
| New Shapperies | 1.45 | " | 1.50 |
| French Blues | 2.25 | " | 2.50 |

## BAGGING

(Prices to Mill, f. o. b. N. Y.)

| | | | |
|---|---|---|---|
| Gunny No. 1— | | | |
| Foreign | Nominal | | |
| Domestic | 3.25 | @ | 3.30 |
| Wool Tares, light | 3.25 | " | 3.50 |
| Wool Tares, heavy | 3.50 | " | 3.75 |
| Bright Bagging | 3.25 | " | 3.50 |
| Manila Rope— | | | |
| Foreign | — | " | — |
| Domestic | *5.75 | " | — |
| Jute Threads | 5.50 | " | — |
| No. 1 Sisal Strings | *4.00 | " | — |
| Mixed Strings | 2.00 | " | — |

* OPA Maximum Prices.

## Old Waste Papers

(F. o. b. New York)

OPA Maximum Prices, Baled

| | | | |
|---|---|---|---|
| No. 1 Hard White Envelope Cuts, one cut | 3.37½ | @ | — |
| No. 1 Hard White Envelope Cuts | 3.12½ | " | — |
| No. 1 Hard White Shavings, unruled | 3.87½ | " | — |
| No. 1 Hard White Shavings, ruled | 2.50 | " | — |
| Soft White Shavings, one cut | 2.87½ | " | — |
| No. 1 Soft White Shavings | 2.50 | " | — |
| Soft White Shavings, Misc. | 2.15 | " | — |
| No. 1 Fly Leaf Shavings | 1.67½ | " | — |
| No. 2 Fly Leaf Shavings | 1.12½ | " | — |
| No. 1 Groundwood Fly Leaf Shavings | 1.25 | " | — |
| No. 2 Mixed Groundwood Fly Leaf Shavings | .90 | " | — |
| Mixed Colored Shavings | .75 | " | — |
| Mixed Groundwood Colored Shavings | .90 | " | — |
| Overissue Magazines | 1.67½ | " | — |
| No. 1 Heavy Books & Magazines | 1.92½ | " | — |
| Mixed Books | 1.10 | " | — |
| No. 1 White Ledger | 2.30 | " | — |
| No. 2 Mixed Ledger, colored | 2.00 | " | — |
| New Manila Envelope Cuttings, one cut | 2.87½ | " | — |
| New Manila Envelope Cuttings | 2.65 | " | — |
| Extra Manilas | 1.95 | " | — |
| Mixed Kraft, Env. & Bag Cuttings | 2.75 | " | — |
| Kraft Envelope Cuttings | 3.25 | " | — |
| Triple Sorted, No. 1 Brown Soft Kraft | 2.50 | " | — |
| New 100% Kraft Corrugated Cuttings | 2.25 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| New Jute Corrugated Cuttings | .90 | " | — |
| Old 100% Kraft Corrugated Containers | 1.75 | " | — |
| Old Corrugated Containers | 1.40 | " | — |
| Box Board Cuttings | .72½ | " | — |
| White Blank News | 1.65 | " | — |
| Overissue News | 1.10 | " | — |
| No. 1 News | 1.00 | " | — |
| No. 1 Mixed Paper | .95 | " | — |
| Old Corrugated Containers | .82½ | " | — |
| Mill Wrappers | 1.10 | " | — |

## Twines

All Prices Nominal

(F. o. b. Mill)

(Soft Fiber)

| | | | |
|---|---|---|---|
| Coarse Polished— | | | |
| India | .21 | @ | — |
| White Hemp | .21 | " | — |
| Fine Polished— | | | |
| Fine India | .26 | " | — |
| Unpolished— | | | |
| Box | .17½ | " | — |
| Paper Makers | .17 | " | — |
| Tube Rope | .19 | " | — |
| Wall Paper | .20½ | " | — |
| Wrapping | .23 | " | — |
| Soft Fiber Rope | .19 | " | — |
| Cotton | .25 | " | — |
| (Hard Fiber) | | | |
| Medium Java | .18 | " | — |
| Mex. Sisal | .16 | " | — |
| Manila | — | " | — |

# PHILADELPHIA

## Domestic Rags (New)

(Prices to Mill)

| | |
|---|---|
| Shirt Cuttings— | |
| New White No. 1 | .07¼ |
| New White No. 2 | .05¼ |
| Light Silesias | .05¼ |
| Black Silesias, soft | .03¼ |
| New Unbleached | .07½ |
| Washable Prints | .04¼ |
| Washable No. 1 | .03 |
| Blue Overall | .05½ |
| Cottons—According to grades— | |
| Washable Shredding | .01¾ |
| Fancy Percales | .04¼ |
| New Black Soft | .03¼ |
| Khaki Cuttings— | |
| Unbleachable Cotton Cuttings | .03½ |
| Bleachable Cotton Cuttings | .04¼ |
| Men's Corduroy | .03½ |
| Ladies' Corduroy | .03 |
| Cottonades | .03¼ |

## Domestic Rags (Old)

| | | | |
|---|---|---|---|
| White No. 1—Repacked | 1.80 | @ | — |
| Miscellaneous No. 1 | 1.20 | " | — |
| Miscellaneous No. 2 | 2.65 | " | — |
| White No. 2—Repacked | 2.90 | " | — |
| Thirds and Blues— | | | |
| Miscellaneous | 1.10 | " | — |
| Repacked | 2.20 | " | — |
| Black Stockings— | | | |
| (Export) | Nominal | | |
| Roofing Stock— | | | |
| Foreign No. 1 | Nominal | | |
| Domestic No. 1 | 1.55 | " | — |
| Domestic No. 2 | 1.45 | " | — |
| Roofing Bagging | 1.35 | " | — |
| Old Manila Rope | 5.75 | " | — |

## Bagging

(F. o. b. Phila.)

| | | | |
|---|---|---|---|
| Gunny No. 1— | | | |
| Foreign | Nominal | | |
| Domestic | 3.00 | @ | 3.50 |
| No. 1 Clean bright— | | | |
| Sisal Strings | .04 | " | — |
| No. 2 Clean bright— | | | |
| Sisal Strings | .03 | " | — |
| Sisal Jute | .02½ | " | .02¾ |
| Scrap— | | | |
| No. 1 | 3.25 | " | 3.50 |
| No. 2 | 1.75 | " | 1.80 |
| Wool Tares, heavy | 4.00 | " | 4.25 |
| No. 1 New Light Burlap | 3.00 | " | 4.00 |
| New Burlap Cuttings | 3.75 | " | 4.00 |

## Old Papers

(F. o. b. Phila.)

OPA Maximum Prices, Baled

| | | | |
|---|---|---|---|
| No. 1 Hard White Envelope Cuts, one cut | 3.37½ | @ | — |
| No. 1 Hard White Shavings, unruled | 2.87½ | " | — |
| Soft White Shavings, one cut | 2.50 | " | — |
| White Blank News | 1.65 | " | — |
| Soft White Shavings, Misc. | 1.15 | " | — |
| No. 1 Heavy Books & Magazines | 1.92½ | " | — |
| Overissue Magazines | 1.67½ | " | — |
| New Manila Envelope Cuttings | 2.65 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| No. 1 Mixed Paper | .95 | " | — |
| Box Board Cuttings | .72½ | " | — |
| Kraft Corrugated Cuttings | 2.25 | " | — |
| Old Corrugated Containers | 1.40 | " | — |
| Overissue News | 1.00 | " | — |
| No. 1 News | 1.00 | " | — |

# BOSTON

## Old Papers

(F. o. b. Boston)

OPA Maximum Prices, Baled

| | | | |
|---|---|---|---|
| No. 1 Hard White Shavings, unruled | 2.87½ | @ | — |
| No. 1 Hard White Shavings, ruled | 2.50 | " | — |
| Soft White Shavings, Misc. | 2.15 | " | — |
| No. 1 Fly Leaf Shavings | 1.67½ | " | — |
| No. 2 Fly Leaf Shavings | 1.12½ | " | — |
| No. 1 Groundwood Fly Leaf Shavings | 1.25 | " | — |
| No. 2 Groundwood Fly Leaf Shavings | .90 | " | — |
| Mixed Colored Shavings | .75 | " | — |
| New Manila Envelope Cuts, one cut | 2.87½ | " | — |
| Hard White Envelope Cuts, one cut | 3.37½ | " | — |
| Triple Sorted No. 1 Brown Soft Kraft | 2.50 | " | — |
| Mixed Kraft Env. & Bag Cuttings | 2.75 | " | — |
| Kraft Envelope Cuttings | 3.25 | " | — |
| No. 1 Heavy Books & Magazines | 1.92½ | " | — |
| New Manila Envelope Cuts, one cut | 2.87½ | " | — |
| New Manila Envelope Cuttings | 2.65 | " | — |
| White and Colored Tabulating Cards | 2.25 | " | — |
| Ground Wood Tabulating Cards | 1.35 | " | — |
| White Blank News | 1.65 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| No. 1 Mixed Paper | .95 | " | — |
| Overissue News | 1.10 | " | — |
| Box Board Cuttings | .72½ | " | — |
| New Corrugated Cuttings, Kraft | 2.25 | " | — |
| Old 100% Kraft Corrugated Containers | 1.75 | " | — |
| Old Corrugated Containers | 1.40 | " | — |
| Jute Corrugated Cuttings | 1.87½ | " | — |

## Bagging

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Gunny Bagging— | | | |
| Foreign | (nominal) | | |
| Domestic | 2.75 | @ | 2.90 |
| Sisal Rope No. 1 | *4.75 | " | — |
| Sisal Rope No. 2 | * — | " | 4.00 |
| Mixed Rope | — | " | 1.55 |
| Transmission Rope— | | | |
| Foreign | (nominal) | | |
| Domestic | 2.75 | " | 3.00 |
| Manila Rope— | | | |
| Foreign | (nominal) | | |
| Domestic | 5.75 | " | — |
| Soft Jute Rope | 4.50 | " | 5.00 |
| Jute Carpet Threads | 3.00 | " | 3.50 |
| Bleachery Burlap | 8.50 | " | 9.00 |
| Scrap Burlap— | | | |
| Foreign | (nominal) | | |
| Domestic | 3.00 | " | 3.25 |
| South American | — | " | 3.25 |
| Wool Tares— | | | |
| Foreign | (nominal) | | |
| Domestic | 4.25 | " | — |
| Aust. Wool Pouches | — | " | 3.65 |
| New Zealand Wool Pouches | — | " | 3.90 |
| New Burlap Cuttings | 4.75 | " | 5.00 |
| Heavy Baling Bagging | 4.00 | " | 4.25 |
| Paper Mill Bagging | 2.50 | " | 3.00 |
| No. 2 Roofing Bagging | 1.35 | " | — |

* OPA Maximum Prices.

## Domestic Rags (New)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| Shirt Cuttings— | | | |
| New Light Prints | .04½ | @ | .04¾ |
| Fancy Percales | .04¼ | " | .05 |
| New White No. 1 | .06¾ | " | .07 |
| New Light Flannelettes | .03¾ | " | .05 |
| Canton Flannels, Bleached | .06 | " | .06¼ |
| Underwear Cutters, Bleached | .06¼ | " | .06½ |
| Underwear Cutters, Unbleached | .05¾ | " | .06 |
| Silesias No. 1 | .06 | " | .06¼ |
| New Black Silesias | .03 | " | .03½ |
| Red Cotton Cuttings | .03½ | " | .04 |
| Soft Unbleached | .06¼ | " | .06¾ |
| Blue Cheviots | .05¼ | " | .06 |
| Fancy | .02¾ | " | — |
| Washable | .02¾ | " | — |
| Khaki Cuttings | .02¾ | " | .03 |
| O. D. Khaki | .03¼ | " | .03½ |
| Corduroy | .03¼ | " | .03½ |
| New Canvas | .06¼ | " | .06¾ |
| B. V. D. Cuttings | .06¼ | " | .06¾ |

## Domestic Rags (Old)

(F. o. b. Boston)

| | | | |
|---|---|---|---|
| White No. 1— | | | |
| Repacked | 3.00 | @ | — |
| Miscellaneous | 2.20 | " | — |
| White No. 2— | | | |
| Miscellaneous | 2.65 | " | — |
| Twos and Blues, Repacked | 2.20 | " | — |
| Old Blue Overalls | 2.25 | " | 2.30 |
| Thirds and Blues, Repacked | 2.20 | " | — |
| Miscellaneous | 1.80 | " | — |
| Black Stockings | 3.50 | " | 4.00 |
| Roofing Stock— | | | |
| No. 1 | 1.55 | " | — |
| No. 2 | 1.45 | " | — |
| No. 3 | 1.35 | " | — |
| No. 4 | 1.35 | " | — |
| No. 5, Quality A | 1.35 | " | — |
| Quality B | 1.30 | " | — |
| Quality C | .95 | " | — |
| Old Manila Rope | 5.75 | " | — |

* OPA Maximum Prices.

## Foreign Rags

(F. o. b. Boston)

| | |
|---|---|
| Canvas | (nominal) |
| Dark Cottons | (nominal) |
| Dutch Blues | (nominal) |
| New Checks and Blues | (nominal) |
| Old Fustians | (nominal) |
| Old Linsey Garments | (nominal) |
| New Silesias | (nominal) |

# CHICAGO

## Waste Paper

(F. o. b. Chicago)

OPA Maximum Prices, Baled

| | | | |
|---|---|---|---|
| Shavings— | | | |
| No. 1 Hard White Envelope Cuts, one cut | 3.37½ | @ | — |
| No. 1 Hard White Shavings, unruled | 2.87½ | " | — |
| No. 1 Soft White Shavings | 2.50 | " | — |
| No. 1 White Ledger | 2.30 | " | — |
| No. 1 Heavy Books & Magazines | 1.92½ | " | — |
| White Blank News | 1.65 | " | — |
| Mixed Kraft Env. & Bag Cuttings | 2.75 | " | — |
| No. 1 Assorted Old Kraft | 1.75 | " | — |
| Overissue News | 1.10 | " | — |
| No. 1 News | 1.00 | " | — |
| No. 1 Mixed Paper | .95 | " | — |
| No. 1 Roofing Rags | 1.55 | " | — |
| No. 1 Roofing Bags | 1.45 | " | — |